Dr Charles Mackays poem

The Souls of the Children

at the end of Dr Report of Williamson

Secular School

Contents.

Brought forward,	£178	13	11		
School-fees received during the above period from the children, at 4s. per quarter,	135	10	4		
Sundries,	1	4	6		
Total receipts,				£315	8	9

EXPENDITURE.

Salaries and proportions of Fees to Male and Female Teachers and Monitors for the year 1850,	£160	5	10½			
Rent and Taxes for School-house in No. 1, Surgeon Square, and Halls for public meetings,	23	19	9½			
Fires, Gas, and Cleaning School,	13	18	8½			
School Fittings, Furniture, and Repairs,	34	6	8½			
School Books and Stationery,	36	4	0½			
Apparatus, &c.,	10	14	5½			
Printing Prospectuses, Circulars, Advertising, Postages, &c.,	22	11	3			
Prizes to Children,	3	10	0			
Sundries,	0	12	7			
				£306	3	5
Balance in favour of School,				£9	5	4

Edinburgh, 12*th May* 1851.—I have examined the detailed accounts, of which the foregoing is an abstract, and compared them with the vouchers, and hereby certify that they are correctly stated, and sufficiently vouched.

WM. FRASER, 1 ALVA STREET.

THIRD ANNUAL REPORT

OF THE

WILLIAMS SECULAR SCHOOL.

Man is approaching a more complete fulfilment of that great and sacred mission which he has to perform in this world. His reason being created after the image of God, he has to use it to discover the laws by which the Almighty governs his Creation; and, by making these laws his standard of action, to conquer Nature to his use—himself a Divine instrument. Science discovers these laws of power, motion, and transformation; industry applies them to the raw matter which the earth yields us in abundance, but which becomes valuable only by knowledge; art teaches us the immutable laws of beauty and symmetry, and gives to our productions forms in accordance with them.

Speech of Prince Albert at the Mansion House, March 21, 1850.

EDINBURGH:

MACLACHLAN AND STEWART.

LONDON: SIMPKIN, MARSHALL, AND COMPANY.

MDCCCLII.

Price Sixpence.

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THIRD ANNUAL REPORT

OF THE

WILLIAMS SECULAR SCHOOL.

This School, as mentioned in the previous Reports, owes its origin to Mr William Ellis, of Champion Hill, Camberwell, and is designed for the Instruction of the Children of the Working-Classes. It aims at training them to virtue and usefulness, by instructing them in the constitution of the things and beings which exist, their relations, and the consequences of their various modes of action: and by accustoming the animal propensities, and moral and religious sentiments, to act in harmony with the intellectual faculties, in obeying throughout life the law of God inscribed in the records of Creation.

The object of the School thus includes the training of all the faculties—animal, moral, religious, and intellectual; but in order to avoid the difficulties arising from differences of opinion among the various sects on points of Theological Doctrine, the department of dogmatic Spiritual Instruction is not undertaken, the teaching being confined to matters that are purely secular, or relating to this world and its duties only. This course by no means excludes the training of the religious sentiments: for reverence to the Supreme Being, and obedience to His will, may be efficiently taught, by presenting to the minds of children the evidences of His existence, power, and beneficence—the laws which He has instituted, as they are embodied in His Works of Creation—and the temporal consequences of obeying or infringing them. As these points admit of inductive philosophical demonstration, comparatively few differences of opinion exist in regard to them; while they form a basis upon which further religious knowledge, imparted by its more appropriate teachers, may advantageously be founded. The Promoters of the School desire to leave to the parents themselves, or to such special religious preceptors as they may select, the teaching of doctrines relating to the Supernatural World; and it is here that they would draw definitely the line between Secular and Spiritual Instruction.

The subjects taught include English Reading, Grammar, and Composition; Writing, Arithmetic, Geography, History, Book-Keeping,

Drawing, and Vocal Music; Plain and Ornamental Needlework for the girls; also the elements of Mathematics, Natural History, Chemistry, Natural Philosophy, Social Economy, Physiology, and Phrenology.

The number of children in attendance during the past year 1851, averaged between 120 and 130. The average daily attendance during January, February, and March of the present year has been 154 children—96 boys and 58 girls.

In the first and second Annual Reports the general mode in which the above-named subjects are taught is explained, the object being, in all cases, to reach fairly the understanding of the child by bringing as many of the faculties as possible to bear upon the subject, and taking great pains to ensure that the answers given by the children are not mere repetitions of words imperfectly or not at all understood, but their own expression of ideas fairly grasped. This method, while it aims at imparting ideas rather than teaching mere words, by no means excludes the teaching of words and their proper applications; on the contrary it affords a valuable means of doing this, for when children are called upon to express their ideas in their own words, instead of repeating the words of the book or of the teacher, they receive an excellent practical exercise in the use of words, and the teacher has abundant opportunities of correcting the errors of expression or arrangement to which each pupil is specially liable.

Besides the above-named subjects, lessons are given on several others of a miscellaneous nature, such as the characteristics and beauties of the different styles of architecture, of sculpture, painting, natural scenery, &c.; and the attention of the children is directed to the public buildings and monuments of Edinburgh and the neighbourhood, to the Galleries of Painting* and Sculpture to which they can gain admission, and to the fine scenery around the city. In teaching these or any other subjects, the children are made to understand why they are taught such things, how they tend to their general improvement, and will be useful to them in after life: thus leading them to cooperate rationally and cheerfully with the efforts of their teachers.

They know, for example, that the cultivation of a taste for the beauties of nature and art, besides opening a most pure and delightful source of recreation, tends to refine and elevate the whole character, and they know *why* this is the case—which many of the most enthusiastic adult advocates of art-education do not. In the lessons on Phrenology given to them by Mr Combe, they learn that the faculty of Ideality prompts us to seek the beautiful and perfect in everything, that the contemplation of whatever is beautiful exercises the organ of this faculty and strengthens it, and that when this is powerfully de-

* The Council of the Royal Scottish Academy of Paintings, &c., has liberally made arrangements for the admission, at a moderate fee, of such pupils attending the schools of Edinburgh as may desire to visit their exhibition.

veloped it intensifies and gives brilliancy to the action of the other faculties, stimulating them to seek the highest excellence and perfection in the objects to which they are related; and upon this primarily depends the elevating influence of art and poetry. At the same time they exercise and improve the intellectual and moral faculties.

One of the leading characteristics of this School is the prominence which is given to the teaching of science to children of both sexes. In the last Report the usefulness of this as a means of general training, that is, of calling into the most healthy exercise all the intellectual faculties, and combining their action harmoniously with the moral sentiments and affective faculties generally, was pointed out. Many persons are still of opinion that this kind of instruction is not required in schools for the working-classes; a little reflection, however, must shew that it is to them especially a matter of great practical importance.

In the first place, no method of strengthening the mental faculties, and rendering them vigorous and alert, will be found so efficient as teaching the objects and agencies of nature. It not only furnishes the children with knowledge, but trains them to use it, as the grand element of their future wellbeing in social life. Secondly, the artisan and the agriculturist, in their daily avocations come into direct contact with the objects of external nature; their business is to take advantage of the qualities, relations, and inherent active powers of these objects, and thereby extract from them, or convert them into, useful commodities. Science is simply a systematic knowledge of these qualities, relations, and powers. He who is best acquainted with these, and has the power to apply his knowledge in the required direction, is the best workman.

Previous to the time of Bacon, while what was called science consisted almost wholly of mere speculative pedantry, the unlettered artisan, by practically dealing with nature, possessed more of real scientific knowledge than the learned men of his day. To have taught him their verbose systems of philosophy, would have been wasting his time, and diverting him from more useful and really higher avocations. From this has probably originated the idea, that science is beyond the reach and requirements of artisans and practical men, and that its study should be confined to professional and merely learned individuals. At the present day, however, no rational foundation for this opinion exists. Philosophers now follow the same inductive method of investigation which practical men in all ages have done; but, by more united, skilful, and systematic efforts, they have, in many respects, left the working man far behind in knowledge of the available powers of nature.

Many persons who admit the importance of teaching physical science to boys, are inclined to exclude it wholly or partially from the education of girls, regarding it as unsuitable to the sex, and disposing

to pedantry. This idea can arise only from a misapprehension of what is here meant by science, and is taught as such in this School. It certainly is quite possible to cram the mind of a girl with a large number of mere technicalities, and, by presenting to her as the chief motive to exertion in such studies, the desire to become more learned than the rest of her sex, and to eclipse them by displaying her erudition,—to lead her to connect this knowledge so intimately with her Love of Approbation and Self-Esteem, as to render her so-called scientific attainments useless to herself, and a nuisance to those who are compelled to listen to her displays of them.

But when the realities of science are taught in a proper spirit, the effect will be diametrically opposite to this. When children are made to understand that they are living in a world where every object in existence is a never-resting agent, exerting some influence on everything around it, and being in turn perpetually acted upon by everything else; that they themselves, as sentient beings, are suffering happiness or misery, according as they place themselves in harmony or at discord with these never-ceasing efforts of causation; when they are further taught that their Creator has beneficently endowed them with faculties specially adapted for learning the properties of these objects, their relations and operations on each other and on themselves, and that He has attached the highest and purest gratification to such exercise of these faculties; when they understand this, and that a systematic knowledge of these things constitutes science, science ceases to be pedantry; it is felt to be a necessity, and the study of it a high and holy duty.

A little reflection on the peculiar duties of woman, must convince us that she is continually in need of such science as this. In fulfilling her household duties, she is the handmaid of all the elements. The materials which pass through the hands of a woman who has the charge of a house and family are far more numerous than those which a man usually has to work upon in practising his trade; and upon her knowledge of these materials, and their properties and relations, and consequent uses, will depend the comfort of herself and her family.

It may be said, however, that experience, not science, is the best guide for the housewife. Without in any degree underrating the value of experience, or proposing to introduce scientific knowledge as a *substitute* for it, it must be replied, that all science is but the results of extensive experience condensed into the form of general propositions or principles; that it differs from ordinary experience only in being more systematically collected and recorded.

By tracing the history of the discovery of any established rule in science, we shall see how much of the best kind of experience it embodies.

As an example of this, it may be mentioned, that, some few years ago, a commission was appointed by the French Institute, to inquire into and experiment upon the best and most economical means of preparing

nutritious soup. A number of eminent men, with every means at their disposal, were occupied several years in making a variety of experiments (that is, in skilfully obtaining the most instructive experience) upon this subject. The fruits of their labours are published, and reduced to a few general propositions, which any young housewife, who has been taught the rudiments of chemistry and physiology, may understand and practically apply. Here, then, is a fund of useful experience offered to her, far exceeding that which she could obtain for herself under ordinary circumstances in a whole lifetime. The only requisite for her availing herself of this instruction, is knowledge of the elements of the two sciences now named. With this information, her course of action is plain; without it, this scientific experience is to her a sealed book. The same is the case, in a greater or less degree, with every general principle of science bearing on practical life, which observation and experimental investigation have established.

The warming, cleaning, and ventilating of a house; the selecting, washing, and preparation of clothing; and the selection and cooking of food, may all be prosecuted under the guidance of traditionary and individual empirical experience, or under that of experience illuminated by science. Which kind of experience, the empirical or scientific, will lead most directly, certainly, and economically, to the desired objects—domestic wellbeing and enjoyment? Let us take cooking as our first example.

All the cooking and general household utensils are chemical and philosophical apparatus, and may be constructed and used according to strictly scientific principles. Let us, then, consider the nature of the work to be done by a woman who is called upon to fulfil the duties of a cook.

The amount of nutriment contained in different kinds of food differs very materially. Most of the food commonly used has been analysed, and the analyses published. A woman, acquainted with the elements of chemistry, can refer to works containing such information, and learn the nutritious value of any dish she prepares, and compare this with the cost.

Again, there are two kinds of nutriment required from food,—nutriment for renewing the continually-wasting tissues of the body, and nutriment for the supply of animal heat; the one being, in fact, the building material, the other the fuel, of the system. The proportion in which these exist in the various kinds of aliment varies very considerably; and the relative amount required by different persons, or the same person under different circumstances, also varies greatly, depending upon the physiological constitution of the individual, the climate, season, the degree of exposure, amount of exercise, kind of occupation, &c. The economy of a household, and the health and vigour of its inmates, depend largely upon the proper regulation of these. The use of aperient medicines in spring and autumn,

which is so commonly an established item in domestic economy, is only a clumsy substitute for the scientific adaptation of the diet and clothing to the changes of the seasons, the necessity for such medicine being commonly induced by the derangement of the system caused by unsuitable food or clothing.

Here, again, it may be said, that common experience, and the natural suggestions of appetite, will afford the requisite information. Certainly they will teach us a great deal: but there is also much which they cannot teach us, and which science can supply. Besides, these lessons of experience are often presented in a very disagreeable form. Thus, if a man with good digestive powers, who undergoes but little cerebral and bodily exertion, feeds plentifully on highly-nutritious aliment (such as might be well suited for him under different circumstances), he will suffer from over-nutrition, and will experience—in the form of gout, or other disease—evils that will teach him that he has done wrong. If he has enough of systematic knowledge to read the lesson aright, he may discontinue the practice, and perhaps remove the mischief; but such is not the most desirable kind of experience. Experience, in the form of scientific instruction, which should prevent the mistake and its consequences, would be preferable.

All the operations of cookery, as before remarked, are chemical processes, performed upon organic substances; and a knowledge of organic chemistry must be of the greatest value in enabling the cook to understand and direct these aright, and especially to interpret and make profitable use of the experience daily gained. How few cooks have any idea of acting on any principle whatever in any of their proceedings! They are ignorant of the composition and general properties of the materials they are working upon, and the agents by which they work. They are not only ignorant, but generally in a most unteachable condition. When a woman has been untrained in the use of her observing and reflective faculties, and has not been led to think upon the rationale of the oporations she is conducting, she, in general, at first positively refuses to listen to any explanation of the principles which should guide her, and a great amount of perseverance is necessary in order to induce her to make any such application of her intellect. When the application is made, in her untrained condition of mind, it is generally of the most blundering kind. The works of Professor Liebig and others contain much information of great value to cooks; but what would be the result of putting them into the hands of an ordinary professor of this art? What would she understand of the gelatine, fibrin, gluten, caseine, kreatine, &c., referred to? Although these are some of the substances she is working upon daily, she is unacquainted equally with their qualities and their names.

There is no natural reason why these should be unintelligible to her. They are not a whit more difficult to be understood than such technicalities as "barege," "chantilly," "balzarine," "alpaca," or

the hieroglyphics of a knitting or crochet book. If the assembled Fellows of the Royal Society were told to "Turn and work on other side 4 s, 5 c, 1 dc in the next stitch, 1 s in the next loop, 1 c, 7 dc into loop of 5 chain, turn, 9 c, 1 dc in the same, 1 s into next loop, 1 c, 8 dc into 9 chain, turn 7 c, 1 dc into same, 1 s into next loop, 1 c, 6 dc into 7 chain, turn, 1 c, m 1, 1 l, 1 c, m 1, 1 l, 1 c, m 1, 2 dc, 2 s," &c., they would be as much confounded as any assembly of cooks could be, by the most technical directions the chemist could give them. But why are the technicalities and symbols of the crochet book so mysterious and unintelligible to the learned man, while they are perfectly plain and simple to the school girl? Not from any intrinsic difficulty of the subject, nor from the inferiority of the male intellect, but simply from want of education in that direction. The same is the case with regard to chemistry and cooks.

It is true that these subjects and technicalities may be, and frequently are, presented in such a manner as to be extremely difficult for children to understand. If a teacher describes and demonstrates, however clearly and logically, and goes on as an ordinary lecturer would do, without at every step questioning and cross-questioning the children, to be sure that they understand him, he will probably lead them into a maze of confusion. He must not assume that because he speaks quite grammatically, and his style is most accurate, clear, and simple, he is therefore understood. He must obtain demonstrative proof that they have understood him, by making *them* tell him what *he* has already told them; he must not be satisfied if they repeat exactly what he has said, for then they may be repeating mere words without expressing ideas. They must describe in their own way what they have learned. Many words which are among the most familiar to adults, and to them express clear ideas, are mere sounds in the ears of children; and if we consider the short time that the child has been engaged in the practice of using words at all, it will appear doubtful whether even the words which the children best understand, are as strongly associated in their minds with the ideas they represent, as they become in after life. In connection with this remark, a very important principle, which seems to be but little if at all understood and acknowledged in its relation to education, may here be stated.

A *complex* idea may easily be imparted by words alone, to any one who understands the meanings of the terms which express the elementary ideas of which it is made up. Not so with simple elementary ideas; *these must exist in the mind before the words which express them can possibly be understood.*

Words may *suggest* such ideas when already existing in the mind, but cannot directly impart them in the first instance. In teaching science to young children, such simple or nearly simple ideas have frequently to be imparted; and hence the necessity of objects, pictures, experiments, and references to familiar facts.

If the cook has in this manner been taught the elements of organic chemistry, she will be able to understand what is going on inside the saucepan, and adapt her proceedings to it. Without such knowledge she must depend on her empirical experience alone.

In the simple processes of boiling, stewing, roasting, and broiling, a knowledge of the nature of the chemical changes taking place is of great importance. Thus, to boil meat well and economically, a knowledge of the temperature at which the changes required in cooking take place, and of the means of retaining within the meat its nutritive and flavouring elements, is necessary. The most nutritive, and all the flavouring ingredients, are very soluble, and therefore liable to pass out of the meat into the water; the fibrous structure of the meat permitting this slowly to take place; it is therefore very desirable, if possible, to form a crust around the meat, which shall prevent these from coming out into the water. By taking advantage of the properties of the constituent elements of the flesh, this may be easily effected. One of these proximate elements is albumen. It exists naturally in meat as a viscous fluid, like the white of egg. In this state it is slowly soluble in moderately-warm water. Boiling or nearly boiling water coagulates it, renders it solid, and insoluble. If, therefore, a leg of mutton, for example, which is to be boiled, be plunged first of all in boiling water, and the water be kept boiling for a few minutes, the albumen surrounding the fibres of the surface and a little below, coagulates, and thus forms the required crust which, to a great extent, prevents the loss of the juices of the meat. The meat should not be *boiled* at all after this; but kept about the temperature sufficient to coagulate the colouring matter of the blood, that is, at between 158° and 165°. If it be kept at 212°, or the boiling point of water, (which is commonly the case,) it is rendered tough throughout. This is also the case with stewed meat.

Let us now see what are the directions for boiling meat given in the cookery-book. "All meat, whether fresh or salted, smoked or dried, is best put in with cold water." "Gradual heating softens, plumps, and whitens the meat, facilitates the separation of the scum, on the removal of which the goodness, as well as the beauty, of soup and boiled meat so much depends. Salt facilitates the separation of the scum."*

The process here described is adapted for doing that which should be most carefully avoided. The "scum," which is here spoken of as if it were mere refuse, is some of the albumen of the meat, which is first dissolved by the moderately-warm water, and then coagulated as the water becomes hotter, and thus rises to the surface. This albumen in itself is highly nutritious, and should therefore be retained on this account; further, it should be retained, because it surrounds the

* The Cook and Housewife's Manual. By Mistress Margaret Dods, 9th ed., page 84.

fibres of the meat, and by coagulating there, prevents their contraction, toughening, and hardening. It should be retained also, because by coagulating between the fibres, it keeps in the soluble and still more nutritious, as well as the flavouring ingredients.

Instead of retaining it, the unscientific cook makes the getting rid of as much of it as possible a leading desideratum, even adding salt "to facilitate" its separation. By the gradual heating of the water "the albumen is partially dissolved from the surface to the centre; the fibre loses more or less of its quality of shortness and tenderness, and becomes hard and tough,"* and an unnecessarily large proportion of the kreatine and other sapid ingredients is dissolved out.

Another illustration of the use of science in domestic economy may be given. In ventilation, for instance, how common is it for even experienced housewives to attempt to prevent a draught, by stopping up as far as possible all the crevices of the doors, windows, &c., of a room. If the air is found to rush violently and inconveniently under the door of an apartment in which there is a fire, sand-bags are applied to stop it. But it next whistles through the key-hole, and the top and sides of the door and windows. Further attempts are made to stop up these also, which either fail or cause the chimney to smoke.

An intelligent woman trained to understand that everything must have a cause, and accustomed to trace out the causes of phenomena, as a first step towards preventing or regulating whatever is noxious or disagreeable, would speedily discover that the cause of the inconvenient rushing of the air under the door, is that a current of heated air is passing up the chimney in which the fire is burning, and that air must be supplied from the outside, to fill up the partial vacuum thus formed in the room. As thus, a certain quantity of air must enter the room, the smaller the aperture by which it enters, the more rapidly must it pass through it, and hence the greater will be the draught. The remedy, therefore, for such a draught must be found in increasing instead of diminishing the apertures by which the air enters. This may generally be done by making other and more suitable openings elsewhere; and to avoid a rush of a large body of air at once, a number of small openings, such as are found in a perforated plate of zinc, must be resorted to. Such a plate placed over a door or in a window, will effectually prevent such draughts; and also render the room more wholesome, by affording a better supply of fresh air. To be able to apply such a plate of zinc or other ventilator usefully, a knowledge of the laws which regulate the movements of the atmosphere is necessary; empirical rules will not serve, for an arrangement suited to one room might be very ill adapted to another.

The difficulty of convincing persons who are ignorant of physiology of the importance of ventilation, is well known to all who have tried to improve their habits in this respect. When the functions of respi-

* Liebig, "Letters on Chemistry."

ration and the properties of oxygen and carbonic acid gas are understood, and the number of gallons of oxygen converted into carbonic acid per hour is known, especially if known in early youth, the idea of living in an ill-ventilated room becomes insupportable. If women who have the charge of household matters were early made acquainted with this subject, and taught to comprehend its practical consequences, what an amount of disease, general suffering, and premature death, might be averted by this knowledge alone!

The importance of a general knowledge of physiology to women is also obvious. The ignorance of most mothers of any sort of fixed general principles by which to regulate the supply of food, air, exercise, clothing, &c., of infants and young children is most deplorable. But it may here again be said that the experience of an anxious mother is of more value than scientific rules. Will any woman be content to wait until she has had experience as a mother in order to know how to treat her children? What must become of her first-born in such a case? Call in the aid of older and more experienced mothers, it will be said. Let her try this, and she will soon find, "as many mothers, as many minds." Some of their suggestions may be valuable, but which? If the young mother is unacquainted with any general principles to guide her in her choice, she will be reduced to a state of helpless confusion, and the unfortunate infant may become the victim of chance treatment, or of an erroneous method prescribed by the most persevering adviser. With a knowledge of physiology, she could weigh intelligently the merits of their various practical hints, and choose the one best adapted to her particular case. In this way, the counsels of experience, even though conflicting, would be rendered of real practical value.

In the present day it is difficult to exaggerate the importance to the working-man of a knowledge of the great principles of the sciences. Science has now ceased to be merely the amusement of savans, and an exercise for disputatious dilettanti. To the working-classes it is no longer a mere accomplishment, or simply a matter of desirable erudition, serving only to occupy leisure moments and afford wholesome recreation; but it has become a matter of stern necessity,—absolutely essential to their social wellbeing. It is forcing its way into the practical business of life, and effecting important revolutions in various departments of industry. Most kinds of merely mechanical labour are being, one by one, superseded or modified by it; and the labourer who has nothing but his muscular strength and mechanical skill to depend upon, is daily being thrown into competition with machinery impelled by steam-engines, and with processes of manufacture performed by voltaic batteries and other natural forces; and if he be not qualified to make use of the scientific aids accessible in his age and country, he is doomed to add to the degraded hordes of almost useless human lumber that everywhere stop the way of social progress.

Many attainments which, a generation since, were sufficient to afford a man a competent subsistence, and an honourable position in society, are now insufficient to rescue him from pauperism. The man who could read and write was once, by simple reason of these acquirements, a gentleman; but he is not so now. The operative hand-loom weaver of the last generation earned £2 or £3 per week; and the master who employed a hundred of them was an independent citizen of much social influence and importance. Now, a hand-loom weaver, although a capitalist by being the owner of a loom, and a most industrious labourer, working twelve hours a day, starves upon five or six shillings per week; and, from the sheer necessity of his position, is compelled to bring up his children to the same hopeless occupation.

The woman who could spin, and the sempstress who could knit stockings and make shirts, were formerly able to earn a decent livelihood; but what is the position of the hand-wheel spinner, the stocking-knitter, and shirt-maker now? Machinery has ruined their occupations, but only by supplying more compendious methods of executing their labours. At the same time it has provided the means of subsistence for twice as many persons as lived by these rude trades, but on the simple provision, that they shall qualify themselves to work on the new conditions. Every invention or improvement, every step in the general progress of society, throws hundreds or even thousands of those who are unable or unwilling to keep pace with the general advancement, out of their ordinary employment; and the mechanic, who is a mere mechanic, wound up by his seven years' apprenticeship to move through life only in a certain way, is paralysed by every interference which changes his mode of working; while the intelligent artisan, who, besides knowing his trade, understands something of the natural laws which regulate the movements of the material and social world, is able to foresee the consequences of the change while it is yet in prospect or progress, and by adapting himself to it, generally succeeds in improving his condition instead of being driven to destitution.

If such has been the fate of those who have been unable to keep pace with the progress of the past generation, what is likely to be the future position of those of the present rising generation whose parents are satisfied with affording them an education only up to the standard of their own youthful days? Society is not only continuing to move, but is moving at a continually-accelerating pace. The difference between the present generation and the last, great as it is, is far less than, in all probability, will be presented when the next shall be compared with this.

Scientific instruction, then, instead of being superfluous in the Schools for the children of working-men, is even more imperatively demanded in these than in the Schools for the wealthier classes. Those who inherit wealth, if they are only prudent, may, without suffering any great physical privations, vegetate through life with attain-

ments behind the age in which they live ; but to the young man who has nothing but his own usefulness to depend upon, an education fully up to the standard of the civilization which surrounds him is a matter of life and death.

A little reflection on the chief characteristics of the present era of industrial invention will render the correctness of this remark evident.

The inventions of the earliest periods were merely mechanical. They consisted of levers, wheels, pulleys, inclined planes, and combinations of these, more or less complex, *aiding* muscular strength, but not *superseding* it ; and rarely interfering at all with the efforts of mechanical skill, except to create a greater demand for it, in the construction of these machines. Thousands of years passed before an agent was discovered which, at the will of man, could be made to *generate* mechanical force, and act in many instances as a substitute for animal power. From the moment this was done by the discovery of the steam-engine, human occupations have been undergoing continual revolutions. For a considerable time this agent, the expansive power of heat, remained almost the only innovator, and it supplanted muscular labour rather than mechanical skill. The merely strong man was humbled, but the skilled mechanic was exalted, and his sphere of action increased.

What, however, have the last ten years been doing, and what is the course of the present development of science ? Apparently mere mechanical skill is destined to share the same fate which previously befell mere animal strength. Now the sunbeam paints, electricity moulds and engraves, and every month brings us intelligence of some of these subtle chemical agents being made to perform the more delicate operations of even the most skilful artisan.

But if mechanical skill is to take a lower place, what is to occupy that which it formerly held ? This question may be answered by tracing the change that has taken place in two of the trades which have been recently superseded by electricity, viz. gilding and plating.

The skill of the gilder or plater of former times—that is, of only five or six years ago—consisted chiefly in laying on the gold and silver firmly, evenly, economically, and exactly of the thickness required; and this, especially in plating fancy work, was chiefly a matter of manual dexterity. Now, however, he has to prepare metallic salts ond solutions, watch and feed voltaic batteries and decomposing cells, and his success depends mainly on his knowledge of the laws of electrical action, and his capability of adapting his proceedings to them. He requires, in fact, to change from the mere skilful mechanic into the scientific operator. The metal which formerly he attached to its required place by the skilful labour of his hands, is now carried and deposited there by the most subtle power which physical science has discovered ; and his chief function is to direct and control the agent which the philosopher has placed under his command.

The leading characteristic of the present era of industrial progress seems to be, that *mere* mechanical skill is to be superseded more and more by the applied agency of natural forces; and hence the workman must become more and more the intellectual superintendent and director of these operations. If this idea be correct, one result will be, that the future demand of manufacturing industry will be for scientific intelligence combined with a due amount of mechanical skill, instead of a high degree of mechanical skill alone. Even in agriculture this is taking place. The farmer now requires to be a scientific chemist, to deal successfully with his soil and his manures, and something of a physiologist, to comprehend the best processes for feeding stock; the bare mention of which would have been regarded as a rich joke thirty years ago, and in many parts of the country is viewed in this light still. When the steam-plough comes into use the ploughman must turn engineer, or leave his employment.

The extent to which scientific innovations upon industrial processes might be carried, even at the present day, is far greater than most persons imagine. A large number of valuable inventions are now lying dormant, lost to society, not on account of any natural impracticability in themselves, but from the impossibility of finding intelligent workmen to carry them into effect.

It is a common occurrence for an improved process of manufacture to succeed in the hands of the inventor, or when tried in a laboratory by scientific men, but to fail when brought into the workshop. In these cases the common verdict is, that "it is all very well in theory, but it cannot be carried out in practice." The laws of nature, however, are the same in the workshop as in the laboratory; and when a process which has succeeded in the former fails in the latter, the failure must arise from a want of knowledge of the conditions of success on the part of those conducting it.

The question will perhaps be asked, Can sufficient scientific instruction be imparted to children at school to enable them to become scientific operators instead of mere mechanics, and thus to adapt themselves to the shifting exigencies of their future lot? With regard to children in general this question may be answered in the affirmative. There will of course be some with naturally inferior capacities, who cannot be qualified to perform other than the easier mechanical operations. Let us not, however, be misunderstood. It is not pretended that the extent of scientific information which can be imparted in a school for the children of the working-classes (who leave it so early) can be sufficient to enable them at once to understand and apply every improvement in manufactures depending on science; but this much may be accomplished: They may be made acquainted, as they are at this School, with the great principles of science, and thereby rendered capable of seeking in the proper places for the special information required, and also to understand the technical language in which

it is expressed. The Teacher of this School may quote his own experience in illustration of this remark. At the time when electro-plating and gilding were first introduced, he was in London engaged in electro-metallurgy, and several platers and water-gilders came to him for materials and instruction in the new process. Some of these were members of Mechanics' Institutions, and had studied a little of general science, and chemistry in particular. These men were able to read and understand the treatises written on the subject; they studied them carefully, and having grasped the principles, they applied them with comparative ease, failing of course sometimes (as all men are liable to do who have not had practical experience in any art); but then every failure was instructive, for they were able to discern the cause of failure, and thereby to overcome the difficulty and avoid its recurrence. Others of them were respectable skilful mechanics of average natural intelligence, but quite ignorant of science and the technical terms used in expounding it. They were besides wholly untrained to the task of tracing scientifically the operations of the various agents exhibited in natural phenomena. They had purchased manuals on electro-metallurgy, and had endeavoured to follow out mechanically the directions given in them, despairing altogether of understanding the scientific principles upon which the art depended. The consequence was that sometimes they succeeded, sometimes they failed; but they scarcely ever knew *why* they succeeded, or *why* they failed; and their experience therefore was of little value. After wasting much time and material, most of them threw up the new process in despair, and returned to the old method, struggling on in a hopeless effort to compete with those who had the advantage over them in being able to wield it. Some of them were compelled to take a subordinate place, doing the cleaning, "scratching," and burnishing at the trade, while their more intelligent associates directed the electrical operations.

Some persons are apt to undervalue the teaching of the general outlines of science, and to call it a mere useless smattering. This opinion is frequently entertained by such as have studied very minutely the more recondite details of some particular branch of science, with the view of making original investigations and discoveries. A little reflection, however, will shew that what is thus frequently regarded by the learned as the profundities of science is in reality only the smatterings; while that which is apt to be treated lightly, as mere smattering, is truly the profound part of our knowledge.

When Newton saw the apple fall and reflected on its relation to the movements of the moon and planets, he had a smattering of the universal principle of gravitation; and as he laboured on with the calculations and demonstrations of the "Principia," he was still a smatterer, until he demonstrated completely the great universal law, that all bodies tend to each other with a force varying directly with

their mass, and inversely with the square of their distance from each other. Then his knowledge became truly profound; but this, which was the culmination of the greatest efforts of the great Newton, is now regarded as one of the most trite and simple facts of physical science. It is in reality, however, no less profound or inclusive now than when first discovered, but rather more so, since its universality has been more and more fully established.

The multitude of ingenious and erudite devices of Kepler to arrive at a general expression for the relation between the distances of the planets from the sun, and their periods of revolution, were smatterings and blunderings, though many of them most learned, until he came to the law which bears his name, and which may now be taught in a few minutes to any boy who knows the meaning of square and cube.

When Le Verrier and Adams observed the irregularities of the orbit of Uranus, and by a series of difficult calculations inferred from them that another planet existed in a certain place beyond, they had a *smattering* of the fact. When the telescope was pointed in the direction they had indicated, and the planet Neptune was discovered, this became converted into positive knowledge, and it is easy to communicate this discovery and the evidence on which it rests.

When Franklin, Beccaria, Cavallo, and others, were experimenting on the influence of electricity on magnetic needles, and when Oersted in 1800 published his first theoretical glimmerings on the subject of electro-magnetism, these were regarded as some of the most erudite, difficult, and profound details of experimental science. But if we turn back to them now, it will be seen that they were but the smatterings of what has since become established as a separate branch of science, and to which we are indebted for the electric telegraph. The subsequent discoveries of Oersted, the generalisations of Ampere, the elegant investigations of Faraday, and the various contributions of other philosophers, have rendered the subject, step by step, more and more simple, just as our knowledge of it has become more and more profound by the establishment of great general laws including all these details.

Many years of patient labour were bestowed by the discoverers in gradually elucidating these smatterings; and the learned men who closely followed their revelations, were compelled to read through volume after volume filled with minute and intricate details, before they could repeat their experiments. But when at last the truth was reached, the results of the whole previous investigations were embodied in a few clear and intelligible principles as rules, the obscurity and difficulties vanished, and it became possible to communicate in comparatively a few easy lessons, all that had been established and all that had become practical out of these extensive observations and profound reflections.

The same is the case with science generally. As we approach the

boundaries of human knowledge we come upon obscure, because only partially-developed, truths, to comprehend and unravel the true significance of which, a powerful, practised, and instructed intellect is necessary. As the subject is more and more investigated, that which was obscure and difficult gradually becomes more clear and simple, the simplicity and real profundity progressing together. To the professional man of science a minute knowledge of all these obscure details is of essential importance, his object being to make fresh discoveries; and this he can accomplish only by adding to these details, by arranging them, and tracing their relations and analogies, until the general simple principles upon which they depend are clearly brought to light. It is at once conceded, that to do this great service to mankind the highest amount of intellectual power, combined with the most indomitable industry and perseverance, is necessary; but when it has been achieved, the *results* of all this labour may be easily understood by young children of average intellectual capacity.

It is these results, these clearly established principles of science, and these alone, which possess practical utility. The obscure regions are the unreclaimed wastes of creation, not yet rendered available for human use. Ascertained principles, therefore, and their applications, constitute the subjects taught in our School, and they are taught easily, not because they are the smatterings, but, on the contrary, because they are the most profound yet simple truths.

Another important reflection is suggested by the influence of science on the occupations of working-men. It has been already stated that attainments which a century ago would have sufficed to earn a comfortable livelihood, are now insufficient to rescue from destitution. It has recently been stated that in London one-tenth of the labouring population is in this condition. We know that the great majority of these unfortunate beings are so, because they are ignorant and untrained, and consequently without the knowledge, skill, and power of steady application, which are necessary to subsistence in a country which is densely peopled, and considerably advanced in civilization. They possess, however, attainments which would be sufficient to provide themselves with the physical necessaries of life in a country where the population was thinner, and some of the land unappropriated. Their position resembles that of the native American Indians when invaded by the Anglo-Saxon race. While the Indians were alone in small numbers, and no superior people near them, their knowledge and skill were sufficiently great, and their habits sufficiently regulated, to enable them to live upon the game of their forests, and their wild prairies; but surrounded by a higher civilization, they were incapable of maintaining their own position, and also of appropriating to themselves the skill and intelligence of their invaders. Their attainments were rendered valueless; and they either fled into remoter wilds or perished.

This tendency of the progress of civilization to extinguish the ignorant and untrained, imposes upon the instructed members of the community the duty of aiding their less fortunate brethren in acquiring those additional attainments which its own progress has rendered indispensable for their subsistence; and hence an ever-increasing necessity for an improved education of the masses unfolds itself as civilization advances; a provision for it ceases to be a charity, and becomes a claim and a duty that cannot be safely resisted.

Those who, with a deficient education, are thus struggling against the difficulties which a higher civilization imposes upon them, perceive this, and feel it far more deeply than the middle and upper classes commonly suppose. Unfortunately, the sufferers look upon their own position only from one side; they see it obscurely, and through the medium of their passions, as men in their condition naturally do. Like most men they have but an imperfect perception of their own shortcomings; and thus they regard their misery as the result of a general conspiracy of the more successful classes against them. Hence they resort to machine-breaking, rick-burning, and land-steward shooting, as practical remedies, and respond to such doctrines as "property is theft," "competition is an iniquity," &c. There are few, if any, errors that have ever taken hold upon masses of people, which, if candidly examined, will not be found to rest upon some truth, or fragment of truth; and thus it is with these wild atrocities, and the irrational consequences expected from them. They have a cause in the misconduct of the superior classes against whom they are directed, which consists in their neglect to provide for the natural and necessary effect of advancing civilization upon those who, in many instances, have been rendered incapable of keeping pace with the general progress, by want of opportunity of obtaining the requisite qualification.

The dangers which may result from errors of this kind, at once suggests the importance of another branch of science, the teaching of which forms a prominent part of the business of this School, viz., Social Economy. The importance of this science as a branch of general education, does not, however, rest upon the prevalence of these or any other popular errors; it is fundamental. In order to secure his own wellbeing, man is required to place himself in harmony not only with the inherent powers of physical nature, but also with the moral and social forces which surround him. He may possess a great amount of a certain kind of knowledge, and also exquisite skill of a certain sort, and yet be destitute. In order to obtain from his fellow-men such necessaries and comforts of life as they produce, and without which he cannot in any civilized country exist, he must have attainments adapted to his social circumstances, and industry to render them useful to his fellow-men. He must co-operate with them—in other words, play his individual part in a complicated drama; to do which, it will not suffice simply to follow his own direct impulses. He must

regulate his operations in accordance with those of other men; and to succeed in this, he must be honest, industrious, prudent, economical, keep appointments, know the uses and abuses of credit, and understand the various institutions and arrangements of which the social machinery is composed, and also the laws of action of the moral forces which set it in motion. These it is the province of Social Economy to teach.

Some persons imagine that the Social Economy taught at this School, consists of political theories or doctrines, which somebody has invented and put together; but this is altogether a mistake. The lessons on Social Economy consist of elucidations of the necessary conditions of individual and general wellbeing; the natural laws, in short, physical and moral, upon which the production and distribution of wealth depend, and which always do and will exist, and which no legislators, or any other human beings, can set aside or modify. The necessity of placing ourselves in harmony with these laws is explained, and the consequences of not doing so exhibited; and thus the practical rules necessary for success in life are pointed out. Industry, economy, parental forethought, punctuality, honesty, self-control, and other virtues, are thus shewn to have foundation in the inherent constitution of the human faculties, and in the relations of external objects to them,—in the necessary nature of things. As the children are taught that man cannot attain wellbeing without these attainments and virtues, they are led to perceive the futility, absurdity, and impolicy of all attempts at evading in conduct the dictates of true morality.

On two days in the week, during the past season, Mr Combe has given lessons on Phrenology to a class of about fifty of the elder boys and girls. Attendance on these lessons is not compulsory; but no parent has expressed a wish that his child should omit them. The children themselves are fond of them, and regard dismissal from this class as a severe deprivation, and it is very rarely inflicted. The object of the class is to instruct the pupils, 1*st*, in the dependence of mental vigour and enjoyment on the health of the body (in the class for Physiology, they are taught the conditions of health); 2*dly*, in the nature of the mental powers or forces which act in themselves and in other men, and the proper uses of these, on which success in life, the esteem and love of their neighbours, and the approbation of God depend; 3*dly*, in the relations which nature has established between these moral forces in each individual and the external objects and beings among which he is placed, and from the action and reaction of which his happiness or misery ensues.

This exposition of the nature, uses, and abuses, of the mental faculties, enables the teacher to carry moral analysis of words and actions far beyond what is possible where these are unknown; and no one, who has not had experience, can conceive how imperfectly moral and religious teaching is comprehended by Scotch children, when conveyed

in the English language, and unexplained. Even after this class had made some progress, and although its elder members are from 13 to 14 years of age, not one of them could tell what "moral" and "immoral" or "immortality" meant. They were asked if they had never heard in church that the Gospel had brought "life and immortality to light?" Twenty voices answered, "Yes." What, then, did these words mean? No one could tell. And it was not want of mere expressions to convey their ideas, that prevented them from answering. They were encouraged to frame any sentence in Scotch in which they could use the words intelligibly; but they could not. To test them further, they were asked if the lower animals were immortal, and most of them answered "Yes." The explantaion of this apparent dulness is found in the fact, that English is to them in some measure a foreign language. After explaining to them that a "moral" action is one approved of by enlightened intellect, and the sentiments of Benevolence, Veneration, and Conscientiousness, (the offices of which they had by this time learned), and that "immoral" means an action condemned by these faculties, they shouted out, "moral" means "right," and "immoral" means "wrong;" these being their familiar words for moral and immoral. When they were told that the desire for "immortality" arises from the faculty of the Love of Life, which also had been explained to them, they called out, "It means living for ever."

The exposition of the nature, objects, and relations of the mental faculties, and their connection with different parts of the brain, enables the children to comprehend the fundamental cause of the differences of talents and dispositions which they meet with among themselves, and also the absolute necessity of education to exercise, invigorate, and instruct their faculties, so that they may act in the directions which will conduce most effectually to their wellbeing.

Their attention is particularly called to the great fact, that this world is a theatre of active causes or forces, physical, animal, and moral, which are constantly determining the well or ill-being of every individual, and that the object of the School is to instruct them in these. This teaching expounds the basis of social economy, and also affords a basis for practical precepts, and for addresses to the feelings and understandings of the pupils when they do wrong, which reach their inward consciousness, and subdue them to virtue more effectually than any other method which has been tried in this School. Visitors who have heard these exercises in moral and intellectual analysis, have frequently expressed their surprise how children could execute them; but there is no mystery in the process. Every moral force is taught in connection with its organ. It is explained to them, that, *cæteris paribus* (words which are thoroughly expounded), each is weak when its organ is small, and strong when it is large, and thus the organs serve as a visible and tangible basis on which they build easy expla-

nations of the uses, spheres of activity, abuses, and relations of the mental powers.

The lessons in Physical Science, Social Economy, and Phrenology, afford simple means of explaining those institutions and contrivances for promoting social wellbeing, which constitute laws and government. The children recognise the necessity of officers of justice, prisons, and judges, to restrain the animal propensities of such individuals as are so unfortunate as to be incapable of doing this for themselves; also the advantages of protection to property and of industry. A practical illustration of the effects of this teaching may be mentioned. This School is situated near the Cowgate, a street now occupied chiefly by Irish families. The strong Protestant demonstrations which lately took place in Edinburgh, exasperated the Irish Roman Catholic population, and a vindictive feeling arose, which was communicated to the Irish children. They waylaid and beat the children belonging to this School, because they were Protestants. The latter did not retaliate, but told the teacher what had occurred, and a police officer, at his request, attended for several days at the hour of dismissal, and preserved the peace. The children of this School understood the policeman to be the friend and protector of the well-behaved, to whatever rank in life they belong.

When the children have become familiar with the nature and modes of action of the moral and physical forces which are constantly operating in and around them, they are able to understand that a real practical and intelligible Divine government of this world exists, and that they have no chance of escaping from its influence. They would laugh at any one who should seriously tell them that a man may be habitually drunken and healthy; idle and happy; dishonest and prosperous; or harsh and beloved; because they could trace the natural and unavoidable tendency of these habits to opposite results; and the connection of the action with its consequences is so sedulously impressed upon them, as of Divine appointment, and, therefore, implying a Divine command given to them for their guidance, that they form notions of their personal subjection to the laws of the Supreme Power, which afford a reasonable prospect of proving beneficial to them in the life for which they are preparing. The more amply the moral and intellectual regions of the brain are developed in the individual pupils, the more fully do they comprehend and embrace these lessons, a proof that the lessons are really adapted to awaken and gratify the highest elements of our mental nature.

In the last Report it was stated that corporal and other severe punishments had been entirely given up, and that this was attended with the most satisfactory results. Another year's experience adds fresh testimony in confirmation of this statement.

From the commencement of the School, the principal difficulty experienced has been to maintain strict order, without unduly repress-

ing the activity, energy, and natural cheerfulness of the children; and the teacher's aim has been to make the discipline consist in *directing* the exuberance of youth in such a manner as to communicate animation and earnestness to the prosecution of the School duties, instead of crushing that exuberance by harsh severity, and introducing, in its place, dull, unchildish inactivity.

Ever since corporal punishments have been abolished this difficulty has been steadily diminishing. At present, in so far as it exists, it is attributable chiefly to new comers, who have been accustomed to severe treatment in other schools, and in consequence manifest a tendency to break out wildly when at first released from this restraint. The troublesome pupils are mostly boys of from 12 to 14 or 15 years of age, some of whom have been sent here because they have been found elsewhere unmanageable. The month of November has always been the period when the tendency to disorder has been the greatest. This seems attributable to the fact, that during September and October, especially in the latter month, a large number of new pupils join the School. At first they are restrained by the novelty of the situation; but on becoming more familiar with it, and perceiving that there is really no flogging in the School, they begin to break out into disorder. After a short time, however, they become interested in their lessons, the example of the children of the previous season begins to act on them, and this tendency gradually diminishes.

In some instances, younger boys, who, at other schools, have been rebellious and intractable, and have, (after repeated and unavailing floggings,) been dismissed, have here become attentive and anxiously obedient, manifesting both energy and activity, which, under kind treatment, has spontaneously taken a beneficial direction. These are children with large and active brains, in which the intellectual, moral, and animal organs, more especially Conscientiousness, Firmness, Combativeness, and Destructiveness, are all powerfully developed. The effect of flogging on such children is highly injurious. It excites in them a feeling of savage resentment, and drives them into a state of moral outlawry; while with firm but kind treatment they might be made at least moral and respectable, if not even superior men.

In other cases, boys who have been notoriously troublesome at other schools are more or less so here. These pupils are characterised by general deficiency of the moral region of the brain, or of Cautiousness.

A few extreme cases of melancholy deficiency, approaching to moral idiotcy, have been presented. All of these have for the first few weeks played the truant repeatedly, sometimes absenting themselves for two or three days; sometimes on a sunny day they have slipped out in the middle of school hours. The usual course adopted in these cases has been to ask them, why they did not come to school? whether any body had used them ill there? whether being at school made them uncomfortable? whether they disliked the teachers or

their schoolfellows? whether they thought it better to come to school and learn to be clever and useful, or to run away and be useless dunces and blackguards? In a short time these questions penetrate their understandings, or touch their feelings; and as they are not beaten, they begin to comprehend the idea that by running away from their lessons, they themselves are the only sufferers. In time, they leave off playing the truant and become reconciled, and some of them at last attached, to the School; so much so, that the threat of dismissal was found to be the most powerful means of influencing them that could be used.

The extent to which an attachment to the School has grown will be understood from the fact that in some cases children of this kind, who at first could not be restrained from playing truant, have been so completely reclaimed in this respect that they have come to feel mere putting them outside the School door, when they have been troublesome, as a severe punishment. Instead of running away to play, they have stood at the door-post crying, and actually begging to be let in again. In such children as these, Adhesiveness, along with the other organs at the base of the brain, are usually largely developed, and it is through this feeling that they are most capable of being influenced.

Some time ago a boy of this sort, about seven years of age, was brought to the School and entered as a pupil. The next day he did not make his appearance, of which notice was given to his parents. On the following day he was brought, screaming and kicking, to school by a servant. It was with the greatest difficulty that she at last succeeded in dragging him in. The teacher spoke kindly to him, but the child slunk away, evidently suspecting that the kind words were only a decoy, to get him within striking distance; for, with an expression of fear, cunning, and fierceness, very much like that of a hunted animal when brought to bay, he crouched in an attitude of defence, with his arm held over his head, to ward off the expected blow. No blow was given, and the teacher then left him; after which some of the children about his own age, whom curiosity had attracted to the spot, were allowed to congregate round him. When they came near to him he at first kicked and struck at them, but in a short time they succeeded in rendering him more pacific, by telling him that he would not be beaten.

A glance at his head shewed a great development of Adhesiveness, with very large organs of Combativeness, Destructiveness, Secretiveness, and of the other animal propensities, combined with extreme deficiency of the organs of the moral sentiments. The teacher took him by the hand, and asked him if any one had beaten him. He replied that his parents beat him. The teacher remarked that he was very sorry that he had been beaten, and asked the boy a great many questions, expressing at the same time sympathy and interest in all his troubles. When the child's feelings were fairly roused, the teacher made an

offer of friendship and protection, promising to intercede with his parents, and to do everything possible to save him from further beatings, on condition that he would prove his friendship and affection to the teacher by being obedient and attentive. A considerable time was necessary to make him understand and believe this to be a real proposal. At first he looked cunning and sulky, and made no answer to any of the questions put to him, evidently suspecting that all this was the prelude to a flogging. He then stared strangely, as at something that he was quite unaccustomed to, and finally began to cry, and at last clung to the teacher with a touching expression of affection and submission. After this he came to School willingly by himself.

He continued, however, to be troublesome, kicking, thumping, and pinching his schoolfellows, and otherwise disturbing his class; but all the time he remained at the School (about six months, when he was taken away by his parents without any reason being assigned), he manifested a most remarkable and dog-like attachment to the teacher, watching his every movement, and making strong efforts at good behaviour when directly under his eye. When the School was dismissed, he would generally wait about the doors until he received some recognition, a word of encouragement, or a pat on the shoulder from the teacher, and then he started off quite happy.

Much may be done to improve the character of such children as these, if proper means be adopted; but it does not seem possible to render them capable of independent moral self-restraint when placed under circumstances of strong temptation; and in a School like this, where special arrangements cannot be made to meet individual cases of the kind, they interfere so much with the general business of the classes, that, in justice to the rest of the children, it is sometimes necessary to dismiss them. This is especially the case when they manifest a strong propensity to theft, which is a common tendency where the moral restraining powers are so very weak.*

One of the consequences of the abolition of corporal punishments, and the general absence of repressive discipline, has been to afford the teachers many opportunities of observing the natural characteristics of the children, which, under a system of severe external restraint, would have been lost. Among the obstacles which have stood in the way of the general progress of the science and art of education, there is probably none which has had a more injurious influence than the common mistake of teachers, in believing that their business is only to teach their pupils, and that they have nothing to learn from them; that the children are to be modelled to their "system," instead of

* It will be difficult to provide for the proper treatment and disposal of such children until society becomes acquainted with the physiology of the brain. The annoyance, loss, and expense, which they occasion are the natural consequences of the treatment which they receive bearing little reference to their inherent dispositions.

their systems being carefully adapted to the natural requirements of the children. Every teacher needs to be continually taking lessons from his pupils; for it is only by careful observation of the natural phenomena presented by the growth of the infant mind that the laws of its development can be learned; and it is upon these laws alone that sound teaching must necessarily be based.

In order to make such observations intelligently and profitably, the teacher will find it a great advantage to himself to be acquainted with the principles of general and cerebral physiology. Many circumstances have occurred in this School which illustrate strikingly the advantages of this knowledge. Thus it is well known to physiologists that during periods of rapid growth the brain as well as the other bodily organs are weakened. It seems that the vital energies are largely consumed in supplying the general increase of material to the body; and it has been clearly established that, in this condition, the effect of forcing the brain or any other organs into a degree of activity beyond that which their diminished strength can easily support, is injurious to health, and in some cases may even prove fatal to life.

In schools where set tasks are given, and flogging is resorted to when these are not performed, such consequences are liable to occur. The teacher assumes that if a child has been able to do a certain amount of work at one time, he can do the same at any other time; and when he does not do so, the falling off is attributed to wilful laziness, and the rod is applied as an excitement, without further consideration or inquiry. The fear of physical torture may drive the child to overstrain its faculties just at the period when such violent efforts are specially dangerous.

The observations which have been made upon the children in this School have shewn that these constitutional changes are of frequent occurrence. A boy or girl who has been remarkable for activity and intelligence, occasionally, and in some instances suddenly, becomes comparatively dull and stupid. This is usually accompanied by a peculiar expression of the countenance, which it is very difficult to describe, but which may be recognised by an experienced observer who has carefully watched the phenomena. The features become relaxed and have a less plump and youthful appearance than formerly; they acquire a more serious, or, in some cases, an anxious and languid expression. The appearance differs from that produced by a cold, a temporary fit of indigestion, or other similar disturbances of the system, and somewhat resembles—only in a minor degree—the change which, in mature years, we recognise as occurring in the look and gait of a man of broken fortunes, whose mental energies have sunk under his affliction. It still more closely resembles, is in fact very similar to, the expression which physicians recognise as accompanying chlorosis.

At the time when these remarks are being written, such a change

has come upon a boy who a fortnight ago stood the highest in the school for general attainments, activity, and intelligence. He could frequently answer questions which all his class-fellows had failed to solve, and he usually did so with great eagerness. *Now*, when a question requiring any considerable effort of reflection is put to him, he shakes his head languidly, with a melancholy, exhausted expression, indicating the greatest aversion to intellectual effort; which contrasts strikingly with his manner a few weeks since. In algebra he has quite fallen back; the effort required to express a problem in the form of an equation is painful to him, although formerly he took great pleasure in such exercises, and frequently borrowed the book that he might amuse himself with working such problems at home. He was rather troublesome, and sometimes in disgrace on account of his boisterous and trickish activity. He is now most tame and orderly; his voice, which frequently required to be hushed, is now scarcely ever to be heard. In a few months all this will probably be explained by the protrusion of his arms and legs beyond the limits of his jacket-sleeves and trousers.

It is possible that this boy might, by using great severity, be forced to go through his usual amount of work; but the consequences of such overstraining of the brain at such a critical period might prove to be its permanent enfeeblement, and probably a serious derangement of the whole constitution.

In schools in which flogging is constantly used, it is not uncommon to attribute such changes in the conduct of children to obstinacy, sullenness, and wilful idleness, and to flog them with the greater severity, in order to drive the dogged fit out of them. This fate sometimes overtakes even the "dux," upon whose attainments the credit of the school is often based, if he happen to suffer under one of these constitutional changes and refuse to make the same efforts as formerly. In schools, again, where corporal punishments are "*only occasionally used in extreme cases*," it is probable that a large proportion of these "extreme cases" are instances similar to the one above quoted, especially as this disturbance of the constitution is frequently (perhaps always, *when the brain is overtasked*) accompanied by peevishness and irritability, such as commonly accompany illness, weakness, or constitutional disturbance. It is liable to break out in sulky or impertinent answers to the teacher when scolding the boy for his shortcomings, and this is punished by a renewed chastisement. Most teachers who have themselves enjoyed robust health in youth, if untrained in the physiology of the nervous system, cannot conceive the feelings of oppression, injustice, hatred, and disgust, occasionally of fierce revenge, which this severe discipline engenders in nervous, delicate, and high-minded boys. The sense of the wrong done them never leaves them throughout their lives.

Another instance of recent occurrence may be mentioned as illus-

trating the mischievous consequences of beating children in school. A boy 12 years of age was brought to the school about six weeks ago by his uncle, an intelligent man who had studied physiology. He stated that the boy had had a severe illness, at the close of which he returned to his former school, but became dull and stupid; he was beaten daily in consequence of the remissness attending this state; but instead of improving, he continued not only to lose ground in regard to his intellectual attainments, but was reduced to such a state of nervous irritability and feebleness, that he was unable to make any mental effort without crying and trembling. The uncle ascribed the change to cerebral disturbance produced by the illness, and prevailed on the boy's mother to try him at the school in which physiology was understood and acted on. This was done; and the soundness of the uncle's inference speedily became evident. The teacher—as is usual with new pupils—gave the boy a book to read, and asked him a few questions in order to ascertain how far he was advanced. He cried and trembled so much, that although he evidently knew the words in the book, he was unable to pronounce them, except in a very slow, stammering, and blundering manner. He was treated with the greatest kindness, the other teachers and monitors were told not to press him, but to let him do the best he could in his own way, and the other children in his class were made to understand that he was unwell, and that his crying was a consequence of illness, so that their sympathy also was enlisted in his favour. The crying and trembling continued for some days, but regularly diminishing; and now at the end of a few weeks, these symptoms have entirely disappeared, the expression of his countenance has changed, he has become cheerful and happy, he speaks out plainly and boldly what he has to say; and although he is still rather dull and inactive, the improvement he is making is so satisfactory, that in all probability he will ultimately reach a fair average of capacity and attainments. Had he been much longer subjected to the treatment he was receiving, insanity, idiotcy, or death, might have been the result.

Two cases lately occurred, almost simultaneously, which shew how greatly ordinary physiological causes influence the mental powers of children. A boy and a girl no way related, were for some time absent from School suffering from fever. The boy was one of the most intelligent and advanced in the School, the girl was moderately so, but by no means remarkable. When they returned after their illness, the boy had seriously deteriorated in mental power and activity; which, however, he is gradually regaining: the girl on the contrary came back remarkably improved in intellectual capacity, and she now takes the decided lead of the girls in answering the more difficult questions in all the lessons on science. These differences of result may probably have arisen from differences in the kind or severity of the fevers, or in the conditions of the children; and they are mentioned only with a

view to enforce the necessity of a knowledge of physiology to every one who undertakes the training and instruction of the young.

The progress made by the children in the ordinary branches of instruction, namely, in Reading, Spelling, Writing, Arithmetic, English, and Geography, is encouraging and satisfactory. From the number of scientific subjects taught, it might be supposed that the children in this School must in those elementary branches be behind those of other schools where they are exclusively attended to; especially as with the exception of the Arithmetical tables, and a few rules of Grammar, our pupils have no tasks to learn at home, while at most of the other schools the children have from one to two or three hours' work at home every evening. But this is not the case. During the present session a number of new pupils have entered the School who have previously been pupils at other schools. In the usual branches these have all, without exception, been behind (in most cases considerably so) the average of children of their own age who have commenced their education, or have been as much as two years, at this School. Some three or four of the new comers have been equal in one of these branches but behind in all the rest; while the great majority have been far, and about equally far, behind in all of them. This may be accounted for chiefly by the influence of the object lessons and the collective lessons on science in promoting the general vigour and activity of the intellectual faculties. The interest and intelligence which the boys who have had some lessons in Mechanical Philosophy, exhibit in applying their Arithmetic and Algebra to the working of engineering problems illustrates this. The variety of occupation also tends to the same result. Children should never be kept too long at one subject; if so their activity and attention flag, and then the additional time contributes little or nothing to their progress, and sometimes even tends to throw them back, by producing habits of loose and negligent study.

The contrast between the old pupils and the new comers in the collective lessons, where the reflective powers are much called upon, is still more striking. This was brought out remarkably at the beginning of the session, when the number of new comers was greatest. They learned the definitions and facts, as far as words were concerned, and repeated them with great readiness, but when called upon to apply the knowledge which their definitions implied, or to illustrate the principles that had been explained, they were silent, or made such blunders as rendered it difficult for the teacher to preserve order, in consequence of the laughter excited in the pupils of longer standing at the School, at their mistakes. For example, when the course of Natural Philosophy was commenced, and matter was defined, the new comers repeated most correctly, that whatever is appreciable by the senses, whatever we can see, feel, taste, touch, smell, &c., is matter. In repeating these definitions they were evidently using the words as

mere sounds, without attaching any idea to them; for when asked whether a slice of bread and butter is matter, most of them answered "No." What is it then? "It is bread and butter" was the answer. It was evident that their reasoning was limited to the notion that if it was bread and butter it could not be matter; and that if it was matter it could not be bread and butter. Generalisation was a new and unknown process to them. In the same manner, after defining divisibility, they were asked whether a plumcake is divisible. The "ayes" and the "noes" among the new comers were about equal. The roars of laughter which these blunders elicited from the pupils of the previous season, who had been initiated in thinking, exhibited the difference in the state of their reasoning powers.

Mr Angell, who was then teaching the division next to the highest, recorded a similar experience, and remarked that those boys whom at the end of the last session he had regarded as dunces, appeared quito brilliant by contrast with the new pupils who joined after the vacation.

The experiment of teaching reading through the medium of the phonetic system has been tried, and has been found so successful that it has been permanently adopted. In the report of the examination in the Appendix, a statement of the result of this experiment will be found. The further experience of the seven months which have passed since that examination took place fully confirms what is there stated.

The junior divisions are taught by Miss Watkins and by two pupil teachers, William Mason and James Lambert. Since the publication of the last Report one of the girls, Elizabeth Watson, has also been engaged as a pupil teacher, who, besides teaching some of the elementary branches to the younger children, assists Miss Watkins in teaching the sewing, knitting, and other branches of work to the girls. The progress of the girls in these, and their fondness for such work, is a sufficient refutation of the opinion entertained by some, that the teaching of science to girls will tend to divert their attention from feminine duties and accomplishments.

In arranging the division of labour among the teachers, care is taken not to keep one division of children exclusively under one teacher, but to keep up a continual rotation of teachers, more especially with the younger teachers. By this means they are enabled each to teach the subjects with which they are most conversant; and by teaching these in turns to all the junior divisions, each division obtains the advantage of the combined attainments of all the assistant teachers. The collective lessons to the senior division are given by Mr Williams, except on Mondays and Thursdays, when Mr Combe teaches them Phrenology, during which lessons Mr Williams has an opportunity of giving collective lessons to the junior divisions.

W. M. WILLIAMS, *Teacher.*
LOUISA WATKINS, *Teacher.*

The Promoters of this School, in presenting the foregoing Report to the parents of the pupils, and subscribers to the funds, are happy to express their increasing satisfaction with the conduct, talents, and attainments of the teachers and pupil teachers, and with the general progress of the scholars during the past year. The examination at the close of the Session of 1851, took place in presence of a large number of the parents and relatives of the pupils, and of the citizens of Edinburgh, and made an impression which has not only led to an increase in the number of the scholars, but has attracted a more general attention to the merits of the principles on which the School is founded. Mr John Angell from London came to Edinburgh, and studied and taught in the School, and now conducts a flourishing seminary, established by the Society of "Odd Fellows" in Manchester, on similar principles. Another teacher came from Dorsetshire; and a gentleman from Cincinnati, in the United States of North America, has attended in the School all winter, to study the system; while in Edinburgh an increase of interest in it is manifested by an augmentation of the number of visitors who honour it by their presence, it being open on all days and at all hours to public inspection.

In Edinburgh the School still meets with some religious opposition. The Promoters have traced the influence of individual clergymen in directly dissuading parents from sending their children to it, because in their estimation it is "infidel." The ground upon which this charge is usually rested is, that the Bible is not read, and the Catechism is not taught in the School. This is true, and has all along been publicly avowed as the principle on which the Seminary is founded. In consequence of having adopted it, the School is also denied all participation in the Government grants for education, and the benefit of visits from the Government School Inspectors; but, nevertheless, the Teachers and Promoters prefer enduring this species of outlawry to sacrificing what they consider a sacred duty, viz., respecting the religious opinions of all sects. They are happy, however, to add, that the School has been visited twice by the clergyman of the parish in which it is situated, accompanied by another clergyman, and once by a missionary, and also once by a Roman Catholic priest; visits which are cordially welcomed, nay, solicited, by the Teachers and Promoters. Parents, guardians, and pastors, are invited to give, in their own way, the peculiar religious instruction of which each approves to their own pupils; and Saturday is left free, in addition to Sunday, for this purpose. The increase of pupils, and the perfect amity with which Protestant and Roman Catholic, Presbyterian and Episcopalian, Established Church, Free Church, Jew, and other sectarian children meet and study together God's natural institutions, which affect them all alike, and learn to love and respect each other, and to love God as the common Father of all, afford the best proofs of the soundness of the principle. It may be added that neither the Teach-

ers nor Promoters of the School suffer from the hostility now mentioned; but it annoys and irritates seriously religious and truthful parents, who having the evidence of their own experience in favour of the School, still find sectarian zeal ever busy in committing inroads on their peace by denunciations against them for trusting their offspring within its walls. The desire to meet this opposition by a full exposition of the real objects and practice of the School, has induced them, by entering into the details contained in this Report, to trespass at greater length than usual on the attention of their friends. By this appeal, and by patiently submitting to temporary injustice, founded, as they believe, on misapprehension, they hope to awaken the better feelings of good men, and to induce them to change their opinion of the School.

In July and August 1851, at the close of the Session, the annual examination of the children took place, of which a Report will be found in the Appendix. After the examination the Teachers and Children held a holiday at "Habbie's Howe," a classical and beautiful pastoral valley in the Pentland Hills, nine miles from Edinburgh. The children contributed a small sum each, and some friends to the Institution supplied the balance necessary for hiring omnibuses for the excursion. The day happened to be splendidly bright and warm, and the whole party, including some of the parents, highly enjoyed the scenery. In the present season, Mr Williams procured, by the generous courtesy of the Directors of the Royal Scottish Academy, admission at a reduced rate for all his pupils, to the pictures and statuary now exhibiting in Edinburgh, and the children took a lively interest in the beautiful objects thus submitted to their inspection. In the Phrenological Class, the elder pupils had been instructed in the faculties on which art is founded, and in those to which it is addressed; and to them the examination of the pictures and statues was to some extent an intelligent exercise of the intellect and taste. The children contributed one half of the fee, and a friend the other.

Mr Combe begs to be permitted to take this opportunity of acknowledging a very unexpected, and to him very gratifying, mark of respect, presented by the pupils and their parents, in the form of a pair of handsome silver callipers, bearing a complimentary inscription, expressive of their estimate of his exertions in promoting the interests of the pupils.

In the Appendix No. I., an account of the receipts and expenditure for the year 1851 is presented; and the Promoters beg to return their sincere acknowledgments to the Subscribers who have so generously supported the School during the past year; especially to their English and Irish friends. The representation before given of the state of feeling which exists in Edinburgh towards the School, will, it is hoped, be accepted as in some degree an apology for the great extent to which it is still dependent on foreign aid. To the Scotch Sub-

scribers, however, a special acknowledgment also is due; because by appearing as contributors, they expose themselves incidentally to a small sprinkling of that disapprobation with which the Institution itself has been visited; and because the countenance of their names is felt as a support by the parents whom sectarian zeal occasionally desires to frighten and oppress.

The School has to lament the loss of a generous patron in Edward Lombe, Esq. of Melton Hall, Norfolk, who had sent a permanent order on his Bankers to pay £25 per annum for its support, but which, after being paid for two years, ceases by his unexpected death at Florence on the 1st of March 1852. The Promoters venture to express their confidence, however, that pecuniary aid will not fail them, so long as they are able to shew that the funds placed at their disposal are judiciously applied in raising the condition of the children of working-men.

The Promoters conclude by observing, that their views and expectations in regard to the results of the system of teaching followed in this School, are neither extravagant nor utopian. They are convinced that in each pupil the capacity of improvement is affected by the degree of development and the condition of the brain, over which the Teachers can exercise but little control. They may cultivate the minds of the children up to the limits of their natural capacities, but they cannot extend these indefinitely. Moreover, the Promoters know well that the social circumstances in which many of the pupils are placed, when out of the School, are little calculated to render practical the lessons which they have received within it. Further, the hostile feeling with which the School is pursued by some of the middle and upper classes, has a tendency to diminish its usefulness, by discouraging the more sensitive pupils whose position brings them under the influence of their superiors. Finally, both the Teachers and Promoters are well aware that much is still wanting to render the School complete as a model even of their own principles. They claim, therefore, the credit only of having acted up to the best of their means and ability, in pursuing an object of great social importance; and they solicit the indulgence of the Subscribers for imperfections, of which none are more conscious than themselves.

GEO. COMBE,
JAMES SIMPSON, } *Promoters.*

APPENDIX, No. I.

ABSTRACT OF ACCOUNTS OF THE WILLIAMS SECULAR SCHOOL.

(*For the Year* 1851.)

RECEIPTS, DONATIONS, AND SUBSCRIPTIONS.

	£	s	d
Balance from 1850,	9	5	10
The Trustees of W. R. Henderson, Esq.,	50	0	0
William Ellis, Esq., Champion Hill, Camberwell,	25	0	0
Edward Lombe, Esq., Melton Hall, Norfolk,	25	0	0
William Hackblock, Esq., Reigate,	20	0	0
Thomas Horlock Bastard, Esq., Charlton, Dorsetshire,	5	0	0
H. O. Robinson, Esq., Moray Place, Edinburgh,	5	0	0
M. B. Sampson, Esq., 13 Lombard Street, London,	5	0	0
Hewett Cotterell Watson, Esq., Thames Ditton,	5	0	0
George Combe, Esq., 45 Melville Street,	5	0	0
Miss Carnegie, Duncliffe, Edinburgh,	2	0	0
Mrs Leith Lumsden, Meggetland House, near Edinburgh,	1	1	0
Major Mair, 29 Abercromby Place,	1	1	0
Mrs Carmichael, 24 Rutland Square, Dublin,	1	0	0
Miss Douglas, Ainslie Place,	1	0	0
Miss Stirling Graham, of Duntrune,	1	0	0
Miss Murray, Moray Place, (for Children's Excursion)	1	0	0
George Combe, Esq., 45 Melville Street, (for do.)	1	0	0
Misses M. and B. Combe, Edinburgh,	1	0	0
Professor Gregory, 114 Princes Street, Edinburgh,	1	0	0
James Hay, Esq., Leith,	1	0	0
John S. Oliver, Esq., High Street, Edinburgh	1	0	0
James Simpson, Esq., Edinburgh,	1	0	0
R. R. Noel, Esq., Dresden,	0	10	0
Rev. R. Shaen, Edinburgh,	0	10	0
John Russell, Esq., 18 Leith Street,	0	5	0
Carry forward,	£169	12	10

Brought forward,	£169	12	10		
School Fees,	104	7	11		
From Children for Excursion to Habbie's Howe, (6d. each)	2	1	6		
From Phrenological Society and others, for use of Coals and Gas,	2	13	0		
Sundries,	0	3	3		
Total Receipts,				£278	18 6

EXPENDITURE.

Salaries and proportions of Fees to Male and Female Teachers, Pupil Teachers, and Monitors, for the Year 1851,	£165	1	4		
Rent and Taxes for School-house, in No. 1 Surgeon Square, and Hall for Examination,	19	18	8		
Fires, Gas, and Cleaning School,	11	19	3½		
School-Fittings, Furniture, and Repairs,	18	2	8		
School-Books, and Stationery,	24	8	9		
Apparatus, &c.,	2	6	11		
Printing prospectuses, circulars, advertising, postages, &c.,	27	5	2		
Excursion and Refreshments for Children,	5	6	6		
Sundries,	0	9	1		
Total Expenditure,				£274	18 4½
Balance in favour of School,				£4	0 1½

Edinburgh, 20th April 1852.—I have examined the detailed accounts of which the foregoing is an abstract, and compared them with the vouchers, and hereby certify that they are correctly stated, and sufficiently vouched.

WM. FRASER.
1 ALBYN PLACE.

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REPORT

OF THE

ANNUAL EXAMINATIONS

OF

MR WILLIAMS' SECULAR SCHOOL,

HELD AT EDINBURGH ON THE 29TH AND 30TH JULY,

AND THE 1ST AUGUST 1851.

EDINBURGH:

MACLACHLAN AND STEWART.

LONDON: SIMPKIN, MARSHALL, AND COMPANY.

MDCCCLI.

Price One Penny.

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REPORT.

The Examination of the Junior Pupils took place in the amphitheatre of the school on the morning of Tuesday, 29th July, in presence of Mr Combe and Mr Simpson, the Promoters of the School, and a numerous assemblage of the parents of the children, and other visitors.

Before commencing the examination in reading, Mr Williams explained that an experiment had been made during the last session, of teaching the youngest children to read through the Phonetic System. One of the most serious obstacles to the extension of education in this country arises from the difficulties of English orthography. On account of the variable and arbitrary value of the letters of our alphabet when combined to form words, nearly half the period devoted to school, by the children of the working classes, is spent in merely learning to read and spell. Thus, the letter A has 8 meanings; E has 8; I, 7; O, 12; U, 9; Y, 3; C, 6; J, 5; T, 5; X, 5; Z, 4, &c., and not one letter has a fixed value. The whole 26 letters represent 117 sounds, thus averaging 4½ each; and no rules can be given to determine, with any degree of certainty, when they shall represent one and when another of these sounds. Simple sounds are represented sometimes by one letter, sometimes by another, frequently by most inconsistent combinations of letters, and this in so arbitrary and variable a manner as to render reduction to general rules impossible.

In consequence of these complications in our orthography, double the time is consumed in learning to read English that is required in the schools of Germany and Italy to learn to read in the languages of those countries; for in the German and Italian the letters of the alphabet have nearly a fixed and uniform value.

The Phonetic alphabet consists of 40 characters, each having an invariable value, and representing one of the elementary sounds, by the combination of which all English words are formed. In teaching them, they are named by the sounds they represent; and thus to spell a word is but to pronounce it slowly and analytically. Under this system no letter ever changes its value, and no word can be spelled in two different ways. All the characters of the common alphabet are used in the phonetic alphabet, and their most frequently occurring signification in the common orthography is the one they represent in the phonetic. The additional phonetic characters very closely resemble the common letters, so that the words formed by them are

very similar in shape to those commonly used. It is upon this resemblance that the application of the phonetic system, as an introduction to the common reading, depends. The fluent reader does not spell the words as he reads, but recognizes each word as a whole by its shape; and it was stated by the inventors and advocates of phonetic spelling, that children might be taught to read phonetically in one-third or one-fourth of the time required to learn the common spelling, and that from the resemblance in shape of the words of the one system to those of the other, the transition from the phonetic to common reading would be very easy.

The experiment above referred to was instituted with the view of testing the correctness of this statement. Accordingly, the parents of a few of the children were consulted, and, their approbation having been given, a small phonetic reading class was commenced in September last, composed of children from four to five years of age, and just beginning to learn to read. There was in the school another class composed of children from one to two years older, who, a twelvemonth before, had begun learning to read on the old system. In about seven or eight months, the children of the phonetic class could read books printed in the phonetic type quite as well as these latter children could read books printed in the usual type. The phonetic class had decidedly the advantage of the others in correctness of pronunciation, as well as in the interest they exhibited in the mere act of mechanical reading and spelling; for spelling long words was to them merely building them up out of the elementary sounds the signs represented, and when they rightly applied the few simple rules they had learned, they were never disheartened by failure; reading and spelling being, in fact, rendered purely synthetical and analytical exercises as regards sounds. At the end of the eighth month the phonetic class commenced common reading. They were at first assisted by the use of similar lessons printed in the phonetic characters with which they were familiar; but the phonetic key was gradually dispensed with as they became able to read without it. Before the close of the present session, the phonetic class had overtaken, in common reading, the other, which had been about double the time engaged in that study. This result was exhibited to the audience by the phonetic class having first shewn their attainments in phonetic reading and spelling, and then in common reading; and then the other class above referred to having read from the same book, it became evident that the phonetic class could read quite as well as the other.*

* In consequence of the success of this experiment, it is proposed in future to teach all those children who commence their education at this school to read phonetically for the first twelvemonth at least, and then to pass them on to the common orthography, when their intellectual powers have been sufficiently trained, by the logical method of phonetic spelling, and the object-lessons they receive, to comprehend the common system.

After the other classes were examined upon reading, an object-lesson on a book was given, to shew the manner in which the children were made acquainted with familiar objects. They were questioned upon the physical qualities of the book, and its component parts; upon the manufacture of paper, and upon the substitutes for paper used by the Egyptians, Greeks, Romans, Anglo-Saxons, and the Chinese. In their answers they described the mode of manufacturing paper from the papyrus, from the bark of trees, from leaves, from rice,—the use of wax, ivory, and metal tablets, and parchment,—the kind of books used by the ancients and in the middle ages,—the cost of books before the invention of printing,—the history of the invention of printing and its introduction to this country, and the advantages we derive from it,—the importance of learning to read and being able to use books, and of education generally.

They were then examined upon Geography, when they pointed out the situations of the various countries, seas, rivers, mountains, &c., on the Map of Asia, and the counties, chief towns, and rivers of England.

They were next questioned upon the subject of Physiology, the rudiments of which had been taught even to the youngest children. They named most of the bones of the skeleton, and the different kinds of joints, the uses of the bones and the muscles generally, the principal organs concerned in digestion, and the more striking physical changes the food undergoes during its conversion into blood. This part of the examination was conducted chiefly by William Mason, and that on Geography by James Lambert, both boys between 14 and 15 years of age, who have been pupils at the school from about the commencement, in December 1848, and have lately been articled as pupil teachers.

The needle-work and specimens of knitting done by the girls, under the instruction of Miss Louisa Watkins, were then exhibited and examined, and elicited the approbation of the mothers, and that of the lady-visitors.

The Second Examination took place in the Waterloo Rooms, on Wednesday evening, July 30th, in presence of the Promoters of the School and above 200 visitors.

The whole of the pupils in the school are classified into four divisions, the first being the youngest, and the fourth the most advanced. On this occasion, the third and fourth divisions were examined, the first and second having been examined on the previous day. The examination commenced by the children of both the third and fourth divisions reading some of the historical portions of the "Daily Lesson Book" of the British and Foreign School Society.

The third division was then examined on English Grammar by Mr Angell (formerly teacher of chemistry at the London Mechanics Insti-

tution, and chemical assistant to Professor Graham, of University College, London), who had been, during the last three months, engaged in teaching this division. A proposition was written on the black board, which the children parsed.

The fourth or senior division was then examined on the practical application of the principles of English Grammar, by reading some of Murray's Exercises, correcting the false syntax, and explaining their reasons for making the corrections.

Mr Williams next proceeded to examine both divisions on Mental Arithmetic, explaining that the questions were taken at random from among some thousands of such questions in the two parts of M'Leod's Mental Arithmetic. The children went through several mental exercises on the first four arithmetical rules, and some complicated and difficult questions in ratios, proportion, and fractional arithmetic. A problem producing an algebraic equation was taken at random from a collection of such questions, and worked by one of the elder pupils on the black board.

The upper division was next examined by Mr Williams on Geography, and the application of the principles of Natural Philosophy to the elucidation of geographical phenomena. They were first questioned upon the form of the earth—on the form which a semi-fluid or viscous mass rotating as the earth does would assume. They answered, that it would become an oblate spheroid, such as the earth actually is, and explained the action of the centripetal and centrifugal forces by which such a form would be attained. They were then asked what would result if the crust of the earth were quite unyielding and of a truly spherical form? The whole ocean would be accumulated between the tropics, and the land would be found around the poles. What kind of climate should we have upon the earth in such a case? It would be so cold as to be uninhabitable.

They were then questioned upon the climate of different parts of the earth, and they explained the influence of the varying degrees of obliquity presented by the earth's surface to the rays of the sun upon mean temperature. They were asked whether all countries in the same latitude had similar climates? and Edinburgh and Moscow in the same latitude and the same hemisphere were taken as illustrations. In reply to several questions on this part of the subject, the children explained that the equable climate of Edinburgh, as contrasted with that of Moscow, was attributable to our insular position,—that the properties possessed by water of acquiring its greatest density at about 40° of temperature, and of rendering latent about 1000° of heat when converted into vapour, and the greater powers of absorbing and radiating heat possessed by the land, are the causes of this. In answer to further questions, the children shewed how these causes act in producing these phenomena.

At the suggestion of Mr Combe, the children were then tried upon

their topographical knowledge. The map was removed from the children too far for them to read the names, and on Mr Williams pointing to the different countries, seas, straits, rivers, &c., upon it, these were named by them immediately and correctly.

The children of the upper division were then examined upon Chemistry; previous to which Mr Williams explained that, from the extent of the subject and its applications, it would be impossible to include more than a very small portion of it in the examination; but in order to make that afford a tolerable trial of the general knowledge of chemistry possessed by the children, he had prepared a solution containing a certain number of salts soluble in water, the children being totally unacquainted with what these salts were. Mr Williams then, shewing the solution, asked them how he was to proceed in order to analyze it. They stated what reagents should be applied, and how, and under what circumstances. In every case where no result was produced, and the absence of any substance or group of substances was thereby indicated, the children explained what would have taken place if the substances sought for had been there; and when a reaction was produced indicating the presence of anything, the rationale of the action was explained by them. During the analysis, one of the children registered on the black board the results of each experiment, using the chemical symbols, the whole class being occasionally called upon to explain these symbols.

At the end of the analysis, ammonia, barytes, and the oxides of silver and iron were proved to be the substances that were present in the solution. Mercury, lead, bismuth, cadmium, copper, gold, platinum, antimony, tin, arsenic, cobalt, nickel, manganese, zinc, chrominm, alumina, magnesia, lime, strontian, potash, and soda, were proved to be absent.

Mr Williams then alluded to the advantages of the chemical teaching in affording the children a key to the operations of nature, whether in the earth, or the waters, or the atmosphere; in the physiological phenomena of animals and vegetables, and the thousands of manufacturing processes in which chemical action plays an important part; and stated that, besides these, the course of instruction gone through in chemical analysis was a strict course of logic, not merely theoretical formal logic, but the severest process of reasoning practically applied in the conducting of actual investigations. He said that a single fallacy would betray itself in confusion and failure, which, being physically indicated, would be most palpable to children. It was added, that chemical analysis affords peculiar advantages in this respect, since nothing need be taken for granted. All the data upon which the analysis is based may be exhibited experimentally with but a very moderate amount of apparatus; and being all simple physical phenomena, children of twelve years of age can understand them as well as men of forty or fifty, or of any age whatever.

This concluded the examination of the evening. Mr Combe and

Mr Simpson having shortly addressed the audience, Councillor Bell rose in the middle of the room, and after expressing his high gratification with the attainments of the children, proposed a vote of thanks to the Promoters of the school, which was carried by acclamation.

The concluding Examination of the elder pupils (consisting of the third and fourth divisions, as in the last examination), took place in the Waterloo Rooms, on Friday evening, the 1st of August, in presence of the Promoters, and an audience exceeding 250 persons.

The third division was first examined in physiology by Mr Angell. A skeleton and various anatomical diagrams being presented, they were questioned upon the composition and properties of bone; the alteration of form and shape of bones effected by pressure during the earlier periods of life, when the proportion of the gelatine to phosphate of lime is greater than in later life; on the names, structure, and functions of the bones forming the skeleton, their mode of attachment by ligaments, &c. They were required to distinguish and name those bones which serve principally for the purpose of protection to the more important organs of the body, and those which serve chiefly as the media of attachments for muscles. They explained the structure and functions of the muscles, their mode of action, &c.; and the processes of digestion and nutrition, by which the waste of the tissues consequent upon the muscular and general action of the body, is repaired.

Commencing with the operation of the teeth, tongue, cheeks, salivary glands, &c., in the process of mastication, they went on to explain the action of the tongue, pharynx, and muscular coats of the œsophagus in the act of deglutition; the passage of the food down the œsophagus into the stomach. They explained the general structure of the stomach, and the process by which the food is converted into chyme, and transmitted to the pyloric valve. They described the action of this valve in rejecting the undigested food, while it allows the chyme to pass into the duodenum, into which is poured the bile and pancreatic juice, secretions effected respectively by the liver and pancreas. They further explained the process by which the chyme is gradually converted into chyle, the passage of the chyle along the smaller intestines, and its gradual absorption by the lacteals, and passage through them into the mesenteric glands; and the manner in which it is conveyed to the thoracic duct, is poured into the subclavian vein, and mixes with the venous blood, which is passed into the right side of the heart, transmitted to the lungs, and returned to the heart purified and arterialized: also the passage of the blood out from the heart by the aorta and arteries into the capillaries, where the construction of the bone, muscle, nerve, ligament, membrane, and tissue, of which the body is composed, is effected.

They also briefly described the action of the lymphatic vessels, in absorbing the waste materials, superfluous fluids, &c., of the body, and conveying them to the venous blood in the veins, from which they are separated and thrown out of the body by the action of the skin, lungs, kidneys, and other excretory organs.

Mr Williams then proceeded to examine the children of the fourth division upon those vital processes for the comprehension of which a knowledge of the facts and principles of chemistry is more specially required. The elder children explained the structure and functions of the lungs, and the mode in which the oxygen of the air acts upon the venous blood in the lungs, through the substance of the membrane of the air-cells. They proved the evolution of carbonic acid from the lungs by breathing through a small tube into a glass vessel containing lime-water; the solution, at first perfectly transparent and colourless, became speedily white and turbid from the deposition of the insoluble carbonate of lime, or chalk, produced by the union of the carbonic acid evolved from the lungs with the lime contained in the solution.

They explained that the chemical changes in the blood constitute the source of animal heat, being in fact a slow combustion taking place in the capillary vessels distributed through every part of the animal frame. The theory that the heat is evolved by action going on through the whole of the frame, accounts for the equable temperature which prevails over the body; while, by the theory formerly adopted, the heat was supposed to be generated in the lungs and diffused from them as a centre over the rest of the body. Were this true, the lungs would be hotter than the rest of the body, which is not the case.

They were then questioned as to the source of the iron which constitutes an important ingredient of the blood, and answered that it is derived from the food, animal and vegetable; that almost all rocks contain a small quantity of iron, frequently so small as to be barely distinguishable in analysis, and the soil which is formed by the disintegration of rocks is always found to contain a small trace of iron. In confirmation of this they referred to an analysis they had recently made in the school of some pieces of rock from Salisbury Crags.

They were then asked whether the other metals, such as copper, silver, gold, zinc, nickel, lead, tin, &c., were distributed in this manner? No, they are found accumulated in certain localities, while large districts are entirely without them. What would result if iron were distributed in like manner? Vegetables and consequently animals would be able to exist only here and there on small spots of the earth; the greater portion would be quite uninhabitable. What would result if iron were distributed in the same manner as silica, alumina, lime, and the earths generally, that is, forming a large proportion of the whole bulk of rocks? The earth would, in like

manner, be uninhabitable, for large quantities of iron in the soil would destroy its fertility. This subject was thus extended in order to shew how every step made in the advancement of human knowledge reveals fresh illustrations of the exquisite wisdom with which every part of the universe has been adapted by its Creator to the rest. Until recently, the trace of iron found in rocks was set down by chemists as an accidental impurity.

The knowledge of the principles of physiology and chemistry was next applied in tracing the effects of bad air, drunkenness, over-feeding, under-feeding, dirt, and other immoral habits, in such a manner as to lay the foundation of sanitary observances in later life.

Mr Combe then examined the upper division on Phrenology. Pointing to a diagram, he asked, What does this represent? The brain. The children then traced the connection of the nerves of all the senses and the spinal cord with the brain. He next contrasted the brain of an idiot, very small in its dimensions, with a larger brain of a healthy individual—both adults. Who made the brain? God. Who instituted its functions? God. Do you expect to find indications of his wisdom and goodness in the structure and functions of the brain? Yes. Do you feel that there is a brain within your skulls? No. Did you see any thought or feeling in the brain which you saw dissected? No. By what means, then, have the uses of the different parts of the brain been discovered? By comparing the power of manifesting particular faculties with the size of particular parts.

Mr Combe then examined the children on the general structure of the brain, and its connection with the spinal cord. They described the columns for motion and those for feeling, and traced both sets of nerves to their expansions in the muscles and skin.

He pointed to successive parts on an unmarked skull, and the children indicated the cerebral organs which lay beneath.

They were questioned on the uses and abuses of the various animal propensities, moral sentiments, and intellectual faculties.

Has God conferred bad functions on any of the mental organs? No; they have all right uses, but they may be abused. When do the faculties act rightly? They do so when they all obey the moral, religious, and intellectual faculties.

Three casts of heads were then shewn to the children. In the first, the organs of the animal propensities were very large, and those of the moral sentiments and intellect deficient. The children described this combination of organs as accompanied by strong tendencies to animal indulgence, with feeble restraining powers. In the second, the organs of the animal propensities, those of the moral sentiments, and of the intellectual faculties, were all large. The children described this combination as accompanied by a liability to be greatly influenced by external circumstances: with immoral companions, the

individual would be prone to indulge his propensities; if placed amidst moral, religious, and intellectual associates, he might restrain his propensities, and be a virtuous man. In the third, the organs of the animal propensities were moderately developed, and those of the moral sentiments and intellect were decidedly large. They described individuals of this class as favourably constituted, having great moral, religious, and intellectual powers, with comparatively feeble tendencies to abuse their faculties.

The necessity for educating and training every faculty was then shewn.

On the first class, the influence of education would be smallest, on account of their deficient powers. The more highly gifted should assist, direct, and, if necessary, restrain, this class.

Education and training would produce a great effect on the second class; it might determine their character for good or evil through life.

The third class would profit exceedingly by education and training; and from their high gifts, it is their duty to instruct and assist their less fortunate brethren. The numbers of the first class were small; those of the second considerable; and those of the third numerous.

Various questions were then put to the children to test their power of applying phrenology in the analysis of characters and actions. Among others, the principles involved in the proceedings of the Peace Congress were analysed. Why do nations engage in war? To gain something. What do they expect to gain? Wealth, territory, or glory. What faculties desire wealth and power? Acquisitiveness and Self-Esteem. What faculties desire glory? Love of Approbation, Self-Esteem, and Ideality. What other faculties do these call in to assist them in gaining these objects? Combativeness, Destructiveness, and Intellect. What is the source of wealth? Skill and industry. What faculties are necessary to acquire wealth by skill and industry? Acquisitiveness, the moral sentiments, and intellect. What do nations do when they go to war? Enlist men to fight. Do they feed and clothe them? Yes. Arm them? Yes. Does this cost money? Yes. Where does the money come from? From taxes paid by the people. Where do the people get the money with which to pay the taxes? They work for it. If they did not pay it in taxes for war, might they save it? Yes. Then if France raise, feed, clothe, and arm 250,000 men out of the taxes, will the people of France be richer or poorer? Poorer. If England raise, feed, clothe, and arm as many men to meet the French, will her people be richer or poorer? Poorer. When the armies meet what do they do? Fire powder and shot, and kill and wound each other. Do the powder and shot cost money? Yes. Do they produce any good? No. They serve to kill and wound men. Is war then a natural means for gaining wealth? No; it injures

the people. You said that nations go to war to gain glory, and that the love of glory comes from Love of Approbation, Self-Esteem, and Ideality. When these faculties use Combativeness and Destructiveness to gain glory, is this a use or an abuse of them? An abuse. Does an abuse of any of our faculties lead to lasting happiness? No; to misery. If, then, a nation desires to increase the employment of its people, their wealth, and their general enjoyment, is war a good way of doing so? No; it has contrary effects. With what faculties should Love of Approbation, Self-Esteem, and Ideality act in combination, in order to obtain true and lasting glory? With the moral sentiments and intellect. Suppose the French should try to make the greatest discoveries in science,—to make the best silks and velvets, the most perfect clocks, the most beautiful and useful furniture, and beat the English in these, would this glory injure France? No; it would benefit her people. Would it injure England? No; because she might buy these fine things, or make as good, or better, if she could. If the French and English strove which should excel the other in arts, science, learning, civilization, and virtue, would they benefit or injure themselves and each other? Benefit both. Does man desire happiness? Yes. Has God so arranged the world and so constituted the human faculties that happiness may be reached without abusing the faculties? Yes. By which means—by seeking it from the animal propensities, or from the whole faculties governed and directed by the moral sentiments and intellect? By the latter. If, then, war leads to waste, and waste to poverty, and if an abuse of the faculties does not lead to true glory, is war necessary to human welfare? No. If every person in France saw it in the light you do, would they desire it? No. If every one in England viewed it as you do, would they engage in it? No. Are the members of the Peace Congress, then, acting foolishly in trying to convince the people of France and England of the truth of what you have said in regard to war? No—wisely. But suppose the French cannot be convinced, and make war on England, should we submit? No—we should refer the question in dispute to some one to decide who is wrong. But if the French refuse to refer the point, and insist on fighting—what then? England must defend herself. Is a defensive war, then, justifiable? Yes. But does reason say that aggressive war is necessary? No. Does morality say so? No. Does true religion say so? No. What then, says so? The animal faculties untrained and uninstructed in their true interests. Is it a mark of superior knowledge and wisdom to say that the world cannot go on without war? No; it indicates ignorance and a remnant of barbarism in the feelings.

Mr Williams then put a few questions to the girls exclusively, in order to test their powers of applying phrenological principles. He asked them which of the faculties were active in inducing them to put on their best clothes to come to the examination, or to go to a party?

They answered, Love of Approbation, and Self-Esteem; and besides these, the sentiments of Ideality, Benevolence, Veneration, and Conscientiousness might influence some individuals. In answer to other questions, they explained the manner in which the moral sentiments may exert their influence in such cases; Ideality, by giving the pure love of the beautiful for its own sake; Benevolence, the desire to afford gratification to others through their Ideality; Veneration, by a desire to shew their respect to those present; and Conscientiousness, when they know that in doing all this they were acting rightly and dutifully.

They were then asked whether this combination of feelings always operates in furnishing young ladies with motives for putting on their best clothes, and looking as well as possible? They answered, sometimes the leading motive is to outshine their companions, and gain all the admiration to themselves. What faculties act in this case? Love of Approbation and Self-Esteem without the moral sentiments. Is this right? No. They then compared the consequences of obeying and disobeying the moral laws by supposing the case of two young ladies going to a party, one under the influence of the Moral Sentiments, and the other governed by Love of Approbation and Self-Esteem: they stated that the first would be delighted with the good looks and cheerfulness of her companions, and would share the happiness of all around her, and return home enjoying the most agreeable recollections and reflections; while the one who went to gain great admiration would almost certainly be disappointed; because the lower feelings when acting alone, expect more than it is usually possible to obtain: besides, she would suffer painful vexations if others attracted more attention than herself.

They were then asked what they should do if at any time they found themselves falling under the influence of the unregulated action of the lower feelings? In answer to this and other questions, they replied that they should call up the moral sentiments to control the lower feelings, and that this may be done by directing the mind towards those objects and ideas which are naturally related to the moral sentiments and excite them to action; that the phrenology they had learned enables them to analyse the motives of their own actions, and teaches them the means of regulating them according to the moral laws.

They were then asked, Which is the best time for learning phrenology, and thus applying it, whether while they are children or after they arrive at maturity? While they are children, because their brains are now growing, and the faculties most exercised will be the most strengthened and developed as they advance to maturity.

The upper division was next examined upon Social Economy. After defining the nature of wealth and capital, wages, profit, &c., and shewing that civilization cannot advance without the accumulation of con-

siderable wealth, and that, from the natural laws of man's organization and the physical constitution of external nature, we are compelled, while labouring to produce wealth for the future, to subsist upon the produce of the past labour which has been collected and saved by somebody, and which, when thus saved in order to support us while producing more, constitutes capital,*—they were asked whether the possession of wealth justifies any one in abstaining from productive industry? To this they replied, No: since all wealth is the produce of industry, and no man can live without consuming wealth, the unproductive consumer, whether rich or poor, is diminishing the wealth already in existence by the total amount he consumes. Have we done our duty when we have produced just an equivalent to what we consume? No; for when we came into the world we found a great quantity of wealth accumulated, such as cities, roads, reclaimed lands, a vast fund of knowledge, &c., without which we must have been mere savages; and since all these were bequeathed to us by those who came before us, and we have used them, we are bound in justice to add something to the common stock, and leave the world somewhat better than we found it.

If in a community of 1000 men, all of whom work, only 100 save, what would be the consequence? The 100 would become capitalists, and the 900 remain labourers dependent for their present subsistence upon the savings of the capitalists. In answer to other questions, the children said that the capitalists might either distribute these savings gratuitously among the labourers; or might give it to them as wages, taking in return an exact equivalent of labour; or, thirdly, they might give it to them as wages for an amount of labour which would return the capital and leave a surplus as profit: That, in the first case, all would soon become destitute, as the savings would soon be consumed without return; in the second, the stock would remain stationary or more probably diminish, since the return would be only just equal to the wages paid, and the capitalist would have no motives of self-interest to induce him to continue saving; while, in the third case, the stock of the capitalists would be increasing, and the opportunity thus afforded of gaining wealth would be an additional motive towards inducing all to save. What kind of power is that which the capitalist has over the labourer? The power of rescuing him from the natural results of his own destitution of capital.

What is the greatest injury the capitalist can do the labourer? To consume his capital in unproductive enjoyment, and thus cease to be a capitalist, and thereby become incapable of employing labourers and paying wages.

* The questions and illustrations upon this part of the subject were nearly the same as those used at the last examination: for a detailed account of which see the Report of that examination published in the Appendix of the Second Annual Report of the School.

If all the capitalists were to do this, what would become of the community? They would all become destitute, being unable to subsist until their present labour had yielded its result in an available form. Who are the best fitted to be entrusted with the store upon which we are all living while producing more,—those who have saved or those who have neglected to save? Those who have saved. What result are we justified in expecting if the opposite principle of distribution were carried out? That the store would be diminished instead of increased, and thus all would suffer.

In reply to further questions, they stated, that it is not desirable that a few should possess all the capital and the rest none; but that, to secure a distribution of it, there must be a corresponding distribution of the qualities which acquire and preserve it, namely, skill, industry, morality, and economy. What then is the best remedy for the evils attending the unequal distribution of wealth? To teach the labourers the laws regulating the production and distribution of wealth and capital, and train them in attaining the qualities necessary for becoming capitalists themselves as well as labourers.

In reply to further questions, they stated that a man in earning his livelihood, either as a labourer or as a capitalist, is obeying the natural laws of social existence instituted by his Creator, and at the same time that he benefits himself, is doing his part towards supplying the necessities and furthering the happiness of his fellow-creatures; that when he clearly understands this, his trade becomes raised above a mere minister to his acquisitiveness, and is dignified by moral purpose; and that in following it under these convictions he is elevated by the exercise of his moral sentiments, above the man who looks no further than from his work to his wages, or from his capital to his per-centage of profit.

It should be mentioned that this Report contains merely a faint outline of the examinations, which occupied in all eight hours and a half; but, as nearly as possible, the substance of the answers of the children is given, without attempting to use the precise words in which they were conveyed. Only the general outline of subjects was pre-arranged, and not the particular questions, many of which were suggested by the answers given by the children. The mode in which these answers were given was quite different from that which is usual, where they have been taught their answers by rote. They were given by the children in their own modes of expression, the words and ideas rising extempore—their expression was consequently always thoughtful, and the answers were sometimes given after consultation among themselves. Their happy, intelligent, and thoughtful appearance, was remarked by the audience.

At the close of the examination Mr Simpson moved a vote of thanks to the Teachers, which was carried by acclamation.

APPENDIX No. III.

THE "COVENTRY HERALD AND OBSERVER"

ON

TEACHING THE NATURAL LAWS

IN SCHOOLS.

To the Editor of the Coventry Herald and Observer.

Sir,—In your journal of last week you ask the following questions, and make the following statements:—"In what practical form is a regard for God's natural revelation manifested? Where are the Ministers who explain to their congregations, as an essential part of their duty, the operations of the natural laws? Where are the Christian Schools in which the children are systematically taught to comprehend and obey God through a knowledge of the natural laws? Had we such teaching in our Pulpits and Schools, we should see a different and more Christian state of society. Practically, we say, God's natural revelation is ignored by all Christian Churches."

Now, as these remarks are intended to convey a serious charge against religious teachers of every denomination, including that of the Church of England, to which, I presume, you profess to belong, I beg, as a Christian Minister, to request that you will give a plain and definite explanation of what you mean by "God's natural revelation—the operation of natural laws;" and how "children," or adult persons, are to be "systematically taught to comprehend and obey God through a knowledge of the natural laws."

Secondly, you will oblige me by adducing *some proofs* that in none of the Pulpits or Schools of this City is "a regard for God's natural revelation manifested in any practical form;" and that "God's natural revelation is practically ignored by all Christian Churches."

I am well aware that a newspaper—such as your journal professes to be, of a non-sectarian character—is not a suitable organ for the discussion of theological subjects; but as the *Coventry Herald* is made the almost weekly vehicle for communicating your views not only on political, civil, and educational subjects, but also on those of a peculiar theological character, I presume you will have no objection to comply with the above request. I remain, Sir,

Yours, respectfully,

JOHN SIBREE.

Clifton Villa, Foleshill,
March 23, 1852.

NATURAL REVELATION.

A CLERICAL correspondent, whose letter appears in another column, asks us to give a plain and definite explanation of what we mean by "God's natural revelation—the operation of the natural laws," and how "children" or adult persons are to be "systematically taught to comprehend and obey God through a knowledge of the natural laws." We willingly comply with the request; though we cannot but think that a gentleman who has devoted himself for so many years to the spiritual education of the people, ought rather to be in a position to teach us how God governs his natural creation, and how we should comprehend and obey Him through a knowledge of His laws. The same gentleman asks us to adduce "some proofs that in none of the Pulpits or Schools of this City is a regard for God's natural revelation manifested in any practical form; and that God's natural revelation is practically ignored by all Christian Churches." Now, considering that our journal, according to our correspondent, "is made the almost weekly vehicle for communicating our views not only on political, civil, and educational subjects, but also on those of a peculiar theological character," we almost fear that as regards our correspondent, our labours have been thrown away, and that little additional clearness of vision is likely to result to him from any definitions, statements, or arguments we may have now to offer on the subject of his queries. But, perhaps, it is we who have been obscure; not he who has been dull; and we will endeavour to make up for past deficiencies.

What we understand by "God's natural revelation" is, the external creation by which human beings are surrounded, and the constitution of human nature in relation to that external creation; and experience has proved that children, and adult persons, "may be systematically taught to comprehend and obey God through a knowledge of the natural laws," by showing them in every act of their lives, how those laws operate upon them for good or for evil, according as they are obeyed or disobeyed; and that this natural responsibility is a divine institution established for the wise government of human beings in this world—to promote their happiness, and link them visibly to God as the author and disposer of all things. We say experience has proved this, and we beg to supply instances. A few years ago, Mr WILLIAM ELLIS, of Champion Hill, Camberwell, originated a School in Edinburgh, known as "Williams's Secular School." The express object of this School is to train children to understand and obey the natural laws. There is no expensive School machinery—no selection of pupils; the ordinary School arrangements are similar to those recommended by the British and Foreign School Society, but the children, from the simplest object lessons, up to the lessons in mental science and social economy, are taught to trace the laws which operate in every department of nature upon their own human constitution. We quote from the first annual Report of the School:—

"Physiology, illustrated by a human skeleton, by casts of the muscular system, and by diagrams representing the blood vessels, and digestive and respiratory organs, and also the brain, spinal marrow, and nerves, are used as the basis of explanations of the structure, modes of action, laws of health, and uses and abuses of the bodily and mental organs. Abstract terms and disquisitions are as much as possible avoided, and objects, facts, relations, and mental states, falling within the observation and consciousness of children, and elucidated by numerous and familiar illustrations, are chiefly relied on."

A report of the examination of this School was published in the *Scotsman*, of April, 1849, and we extract from it the following description of the examination of a class in Physiology, particularly with regard to the most vital parts of the human organization—the heart, lungs, blood vessels, the stomach, liver, intestines, and other digestive organs, &c. The Report goes on to say that the pupils were then examined on the *uses* of this knowledge:—

"An infant and an adult skeleton, for example, were placed before them, and they were asked how the one grew to the size of the other. They described the absorption of the waste matter of the body by the absorbent vessels, and its discharge by the skin, bowels, bladder, and lungs; then the renovation of the textures by the deposition of new matter by the blood vessels, bone being given to bone, muscle to muscle, nerve to nerve, &c., where wanted, in order to renew waste and complete growth. They next described how wholesome food, in proper quantity, is necessary to supply the blood with the elements of these structures, and pointed out the consequences to growth and to health of too little, too much, and of ill-chosen food; they described the necessity of fresh air to invigorate the blood, of cleanliness to prevent its being contaminated by dirt absorbed through the skin, and of exercise to preserve the circulation of all the vessels in a state of activity. They were next asked who made all these vessels, bones, and other parts, and appointed their uses? They answered, 'God.' 'Did God intend them for your happiness?'—'Yes.' 'Can you escape from the painful consequences of neglecting cleanliness, fresh air, exercise, and temperance!'—'No.' 'Why not?'—'Because God has made the organs, and made them act as they do; and they act well or ill according to our conduct.' 'Are you thus living under God's laws here and now?'—'Yes.' 'Do you need to die before you come into God's presence and under His law?'—'No; we are under His law here, and He is now present executing His law.'"

We find that in July, 1849, another examination of this school is reported in the *Scotsman*, and that—

"In the evening, the senior division read the chapter on 'Wages,' from Mr Ellis's 'Outlines of Social Economy;' and were then questioned on what constitutes wealth—its sources—the necessity of wealth to human enjoyment—on capital and its sources, and the necessity of capital to the employment of labour—on wages—the relations of capitalists and labourers to each other—the causes of high and low wages—and how high wages can be obtained. In order to obtain high wages, the working classes, it was stated, must acquire skill, and practise industry and economy, and by these means gain capital for themselves; for by no human means can an ignorant, unskilful, spendthrift, reckless labourer be rendered independent."

The results which may be expected from this kind of teaching may be gathered from the following statement in the first annual Report published after the school had been only *one year* in existence:—

"The intellect of the children has been awakened to so great an extent as to have effected, in many cases, a visible change in their manner and appearance—an earnest curiosity and a love of knowledge have arisen, and become a general characteristic of their minds. They evidently begin to feel that they are living and moving in a world which has been created by Divine power, and adapted by Divine wisdom to the nature of man. They perceive the direct influence on their well-being, of the knowledge imparted to them; while they have also learned that they live in a scene of wonders, where fresh beauties and harmonies are ever opening to those who look around with attention and intelligence. They observe, think, and read, spontaneously; in many cases with such earnestness and activity, as to require considerable vigilance, on the part of the teachers, to prevent over-exercise of the brain."

Now, this is what we mean by "systematically teaching children to comprehend and obey GOD through a knowledge of the natural laws," and this teaching has been already effected, not only in the School in Edinburgh, but in several Schools, established upon the same principles, by Mr ELLIS, in the neighbourhood of London. When, therefore, Mr SIBREE asks us to adduce some proofs that in "none of the Schools of this City is a regard for God's revelation manifested in any practical form," we ask him to adduce a single instance in which the natural laws are taught in our Schools, in the direct and emphatic manner above indicated. Mr SIBREE must know that in the *very best* of the Schools in this City, there is no systematic,

intelligent attempt to cultivate the feelings of natural responsibility to God, through a knowledge and obedience to his laws, viz., the laws which relate to health—to the human mind—to well-being in our social, political, and religious relations. We doubt whether, in any case, the teachers have themselves been taught to trace and to feel the full force of this natural responsibility. Go to the Schools, and see little careless children teaching children the ordinary rudiments of learning, and the master vainly exercising his skill upon a single class, or giving simultaneous lessons, in which one-half of the children are not interested, either through their previous acquaintance with the subject, or their want of preparation for the lesson. In fact, neither in principle nor in practice, is there anything more than a chance and blundering recognition of important natural truths in the various imperfect systems of School education, which prevail in this country.

As to "how adult persons may be taught the natural laws, we may point to the means by which they *have been* taught the elementary branches of the sciences. As one mode, though an imperfect one, in which they may still be taught to comprehend "the ways of God to man," Mechanics' Institutions have unlocked the secrets of nature to many an aspiring and self-made man; and we can point to individuals, in our own community, who, by the knowledge of God's laws obtained by these means, have been enabled so to regulate their lives and actions, as to become highly useful and respectable members of society. The Pulpit is at present exclusively devoted to the inculcation of dogmatic theology; but we have always thought that it would at least be as usefully employed in explaining and unfolding the natural laws. And what theme so noble, so exhilarating, so pregnant with example and vital interest? Every week's history—every great man's death—every large calamity—every great success—the common incidents of life—the affairs of the market and the Council—the records of our Courts—the state of our Prisons—the economy of our towns—the condition of the poor—all that the past reveals in the lives of heroes or saints—the rise and fall of nations—and the visible progress of humanity, all teem with illustrations of the natural laws;—all afford lessons which the earnest preacher should know how to enforce, so as to have an actual present influence on the lives of individuals and the state of society. Mr. SIBREE asks us to adduce proofs that the Christian Churches practically ignore God's natural revelation. We answer, if the natural laws were practically taught by Christian Churches, the whole state of society would of necessity represent a wholly opposite condition to that which now exists. For intemperance, we should have sobriety:—for rude selfishness, ignorance, crime, vice, and the thousand other forms of evil, we should have intelligence, order, plenty, and happiness;—and for dissension, competition, and want of charity among Christians and Christian Churches, we should have unity and love. What, we ask, is the abuse of the noble educational endowments of this country but a shameful violation of God's natural laws?—

"The educational endowments of this country amount to at least £2,000,000 sterling per annum; the Church endowments, perhaps, amount to nearly, or about, four times as much more; making together £10,000,000 per annum, or thereabouts, as a fund for the intellectual and moral culture of the population of this country; yet almost the whole of this immense sum is hedged up;—you cannot put into a particular position a man who is qualified to teach his fellow-creatures, because he does not hold this or that creed. The conductors of a School have turned a child back from its doors, because its parents belong to another denomination. Professorships, that should be solely discriminative of learning and acquirements, make these a secondary consideration, and elevate subscription to a collection of articles of faith into a primary consideration. Everywhere we find that the keeping up of opinions comes in the way of the real encouragement to knowledge and instruction; and thus this vast amount of money runs comparatively to waste."

The Holmfirth catastrophe was a most striking illustration of the violation of the natural laws. A vast reservoir, containing many millions of gallons of water, was erected for the convenience of certain mill-owners. The embankment was suffered to fall into decay, although hundreds of lives, and hundreds of thousands of pounds worth of property, were daily imperilled thereby. A waste pit, costing about £12, would have averted the calamity, which was long foreseen; yet the selfish disputes of Commissioners, and the sheep-like passiveness of the inhabitants, suffered it to ensue. Here was a direct and signal punishment for neglect of duty. An intelligent population never could, with their eyes open, have been subjected to such a calamity. Mr. SIBREE discoursed upon this event; and seldom has there been offered a more striking opportunity for an elucidation of the natural laws; but in what respect did Mr. SIBREE avail himself of the opportunity? His sermon was a description of the *effects*, not the *causes* of the catastrophe, with a solitary remark at the end, that it might be viewed as a punishment for carelessness. But if Mr. SIBREE wants further proof that Christian Ministers and Churches ignore the natural laws, we refer him to his and their opposition to National Secular Education. Half the children in the country are suffered to grow up in ignorance of the natural laws, because Mr. SIBREE and other Christian Ministers cannot agree upon the Christian dogmas they wish to be taught. Mr. SIBREE ought to know that to neglect to impart needful knowledge to one half the population is a shameful violation of the natural laws, which will result in a vast amount of crime, and vice, and poverty that might be avoided. Yet he and others allow this immense moral inundation,—a thousand times worse than the Holmfirth catastrophe,—to overflow the land. The Druid Priests, we are told, "demanded gifts and offerings of their people; and to secure these, they required the people, at the beginning of the winter, to extinguish all their fires in one day, and kindle them again from the sacred fire of the Druids, which would make the house fortunate in the ensuing year. Those who refused the yearly dues were refused a spark, and their neighbours durst not relieve them." In like manner do our modern Christian Churches seek to extinguish all light but their own. "If you want light, come only to our altars—here only is the true light—all others are false; at any rate, all who refuse to receive the light from our Christian shrines, shall have no other

light." And with one half of the land in darkness, in consequence of this theological monopoly, we are asked to adduce proofs that Christian Churches practically ignore God's natural revelation.

If further proofs are wanted, we refer to Mr. Rosevear's letter in our journal of the 19th ult. Our correspondent undertook to correct us for asserting that Christian Churches repudiate in practice the teaching of the natural laws. Yet, in the very outset of his letter, he classed us as among those who deny "all the grounds of human certainty; striking at the root of all evidence; and by a logical necessity, entombing true morality in the same gulph into which they would fain plunge every vestige of the Christian religion." Are we to presume, from this, that the writer believes that the "natural laws," for which we plead, afford "no grounds of human certainty;" that they are opposed to morality and the Christian religion? Subsequently, he complains that we misrepresented the Duke of Argyle, and through him all other Christians, in assuming that the natural sciences are treated rather as something to amuse, than as supplying, as we believe, a *solemn basis* for the education and government of mankind. Now what does the Duke say?—He does not *object* to the natural sciences, nay, he admires them, and talks of their calming influence; —would be glad to see a larger portion of them introduced into the School course. Is this the way to treat a subject that is put forward as the most important in relation to human life in this world? Suppose his Grace or Mr. Rosevear, after insisting upon the importance of the study of the Scriptures, were to be answered—"O yes; we don't object to them, it is a pretty study, with a nice calming influence." But Mr. Rosevear insists that there are few Pulpits in which "the essential *oneness* of all departments of knowledge is not *occasionally* explained." Doubtless it may be frequently asserted that God is at once the author of the Bible and the author of creation; but do the Clergy undertake systematically to explain God's primary work—his creation? We think not; and the proof is offered by Mr. Rosevear himself, who says, "that the vital condition of our great working classes has been criminally overlooked, not less by their employers, than by the Christian Church;" and again, "the Church has neglected her distinctive mission: and the fruit thereof is seen in the alienation of the masses from her sanctuaries and her faith." Could this be said if Christian Churches had systematically trained the people to comprehend the natural laws? But what can we expect, when we find a Christian Minister contending for the truth of God which is in nature, in one sentence, and denying it in another? Mr. Rosevear, left to natural revelation, is "confounded in mystery," at the spectacle presented by the woes of mankind;—views *suffering* as inexplicable in nature; and talks about "the inwrought tendency to evil to which all history attests." Now, if the study of the natural laws proves one thing more distinctly than another it is, that "*suffering*" is a divinely-appointed institution for the reformation of mankind—"suffering" is the punishment for the violation of God's laws; happiness is the reward for obeying his laws; and all history, instead of showing an inwrought tendency to evil, shows the opposite—a tendency towards good,—a continual, ceaseless struggle upwards, to higher and better states of existence. Hence man, at first barbarous, becomes civilized;—idolatry and superstition yield to religion;—slavery is succeeded by freedom;—arts and sciences, originally devoted to the few, become the heritage of the many. In fact, "suffering" is the great teacher; and through it, man is progressive.- Mr. Rosevear, professing to be in favour of secular education, says, "*it in itself* can never be the causative power of *evil*:" and he speaks of the evil being in human nature, and of education arming a man with power to curse his fellow men, &c. We can supply him with instances. There is a tribe, in the island of Sumatra, who are said to be able to read and write, and to be very clever in their worldly transactions; but yet they have an unfortunate habit of eating their prisoners taken in war, and criminals condemned to die. This proves that reading and writing do not always improve people's tastes. We find also that it is possible to educate men to become pedants—mere wordmongers—intellectual sharpers—clever mountebanks—possible to make them religious fanatics, and even to commit murder systematically, as in the case of the Thugs, as an instrument of their religion. But all these are but proofs of the power of education for good or for evil, according as *it* is good or evil; a false training will pervert and distort the man—a right training will develop him into healthy existence. Hence we insist on a training based upon a knowledge of the natural laws, as God's direct, immediate, visible, comprehensible, and indisputable revelation to man. In the truest sense, such a training would be religious: and what rich and abundant fruit may we look for, when our Schools and our Pulpits fairly, fully, and constantly supply such teaching and training! The whole face of the civilized world is being rapidly changed by the grand modern improvements which have been made through the study of God's material creation. A like earnest study of the moral laws—a like wise adaptation to them,—would re-create and Christianize the heart of society. What hinders this, but the scepticism of professing Christians, regarding the natural laws, and their opposition to secular education? "Were but a hundred men," says Coleridge, "to combine a deep conviction that virtuous habits may be formed, *by the very means by which knowledge is communicated*, that men may be made better, not only in consequence, but by the mode and *in* the process of instruction; were but a hundred men to combine that clear conviction of this, which I myself at this moment feel, even as I feel the certainty of my being, with the perseverance of a Clarkson or a Bell, the promises of ancient prophecy would disclose themselves to our faith, even as when a noble castle, hidden from us by an intervening mist, discovers itself by its reflection in the tranquil lake, on the opposite shore of which we stand gazing. What an awful duty, what a nurse of all other the fairest virtues, does not Hope become! We are bad ourselves, because we despair of the goodness of others."

FOURTH ANNUAL REPORT

OF THE

WILLIAMS SECULAR SCHOOL.

Man is approaching a more complete fulfilment of that great and sacred mission which he has to perform in this world. His reason being created after the image of God, he has to use it to discover the laws by which the Almighty governs his Creation; and, by making these laws his standard of action, to conquer Nature to his use—himself a Divine instrument. Science discovers these laws of power, motion, and transformation; industry applies them to the raw matter which the earth yields us in abundance, but which becomes valuable only by knowledge; art teaches us the immutable laws of beauty and symmetry, and gives to our productions forms in accordance with them.

Speech of Prince Albert at the Mansion House, March 21, 1850.

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